THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. CX. No. 2452.] LONDON, MAY 10, 1910. [62ND YEAR. PRICE 6d.

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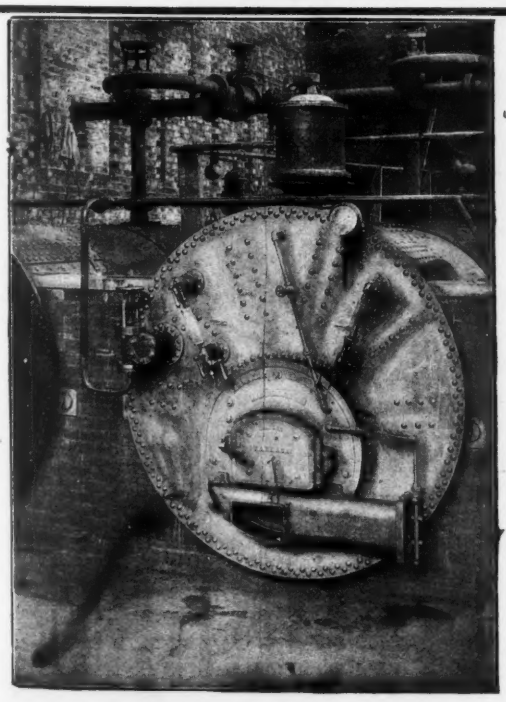

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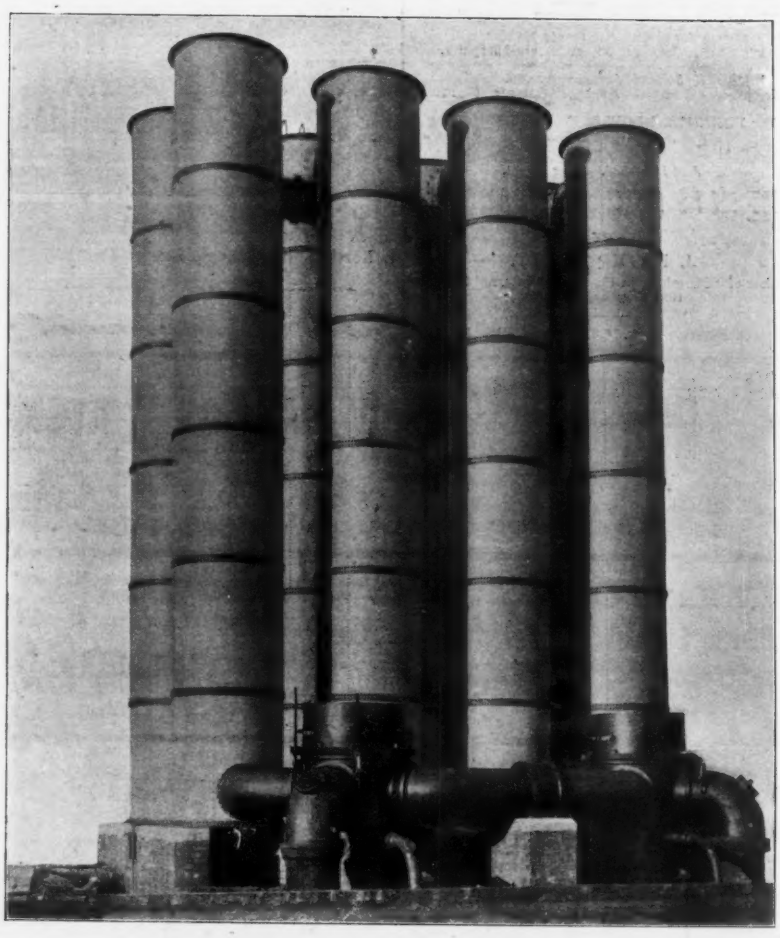

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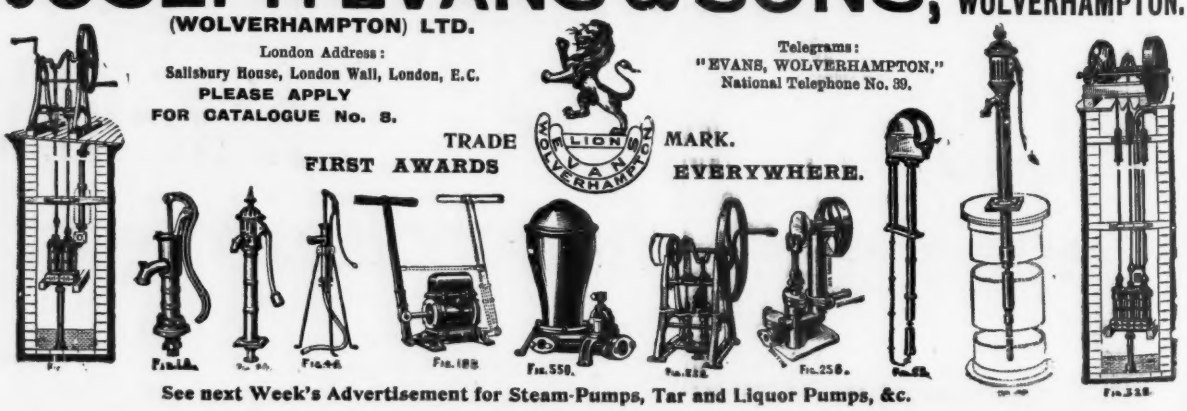

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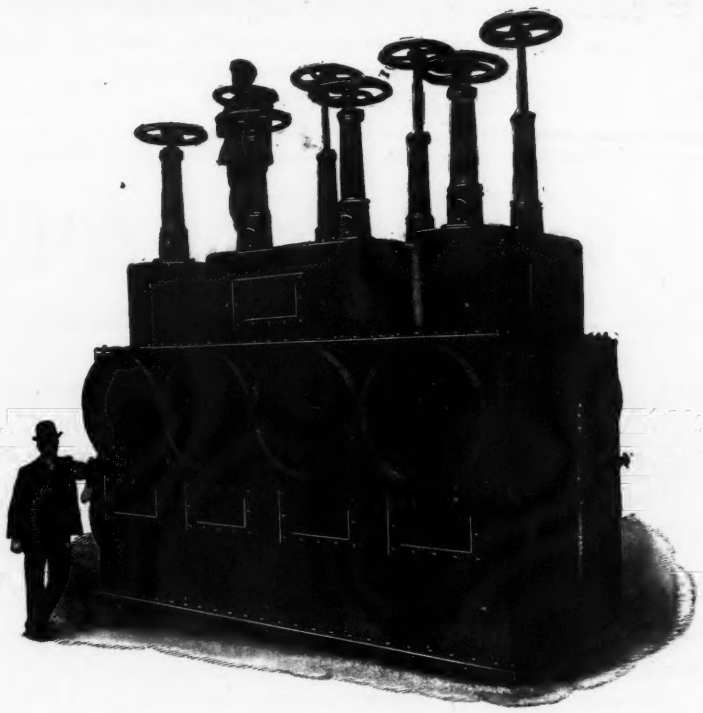

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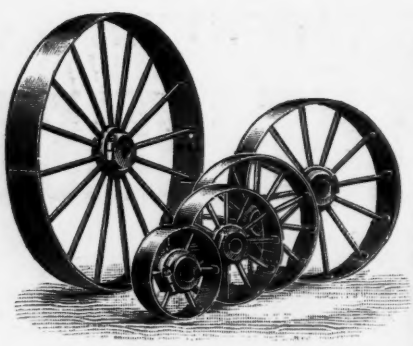

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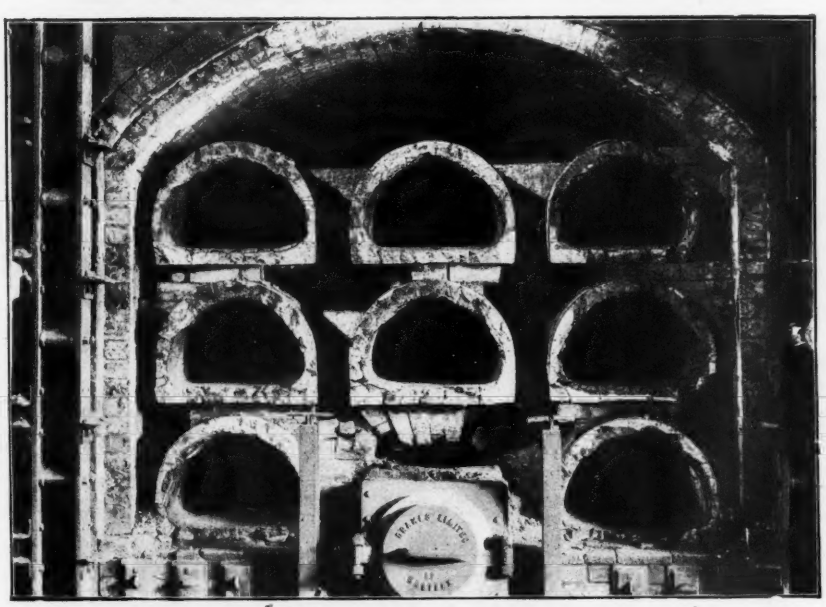

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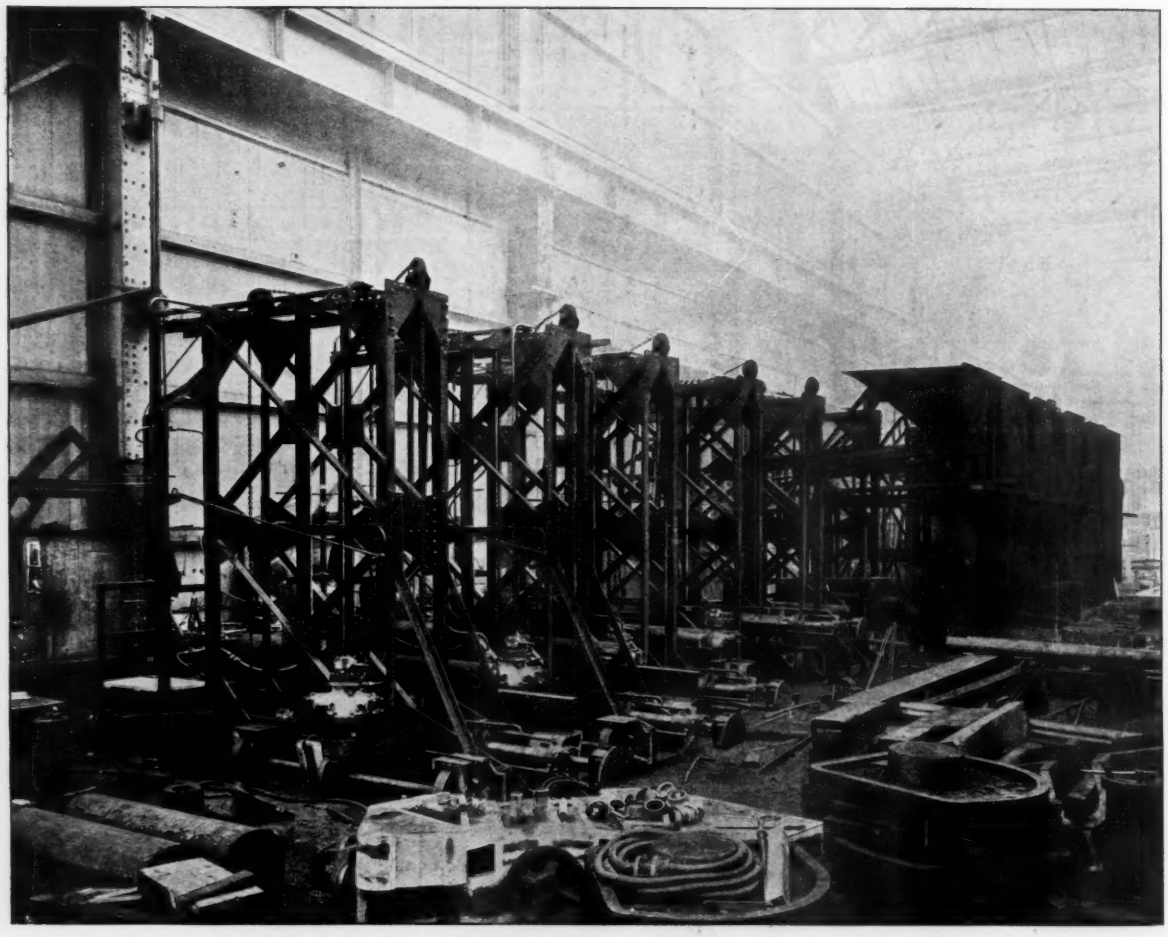

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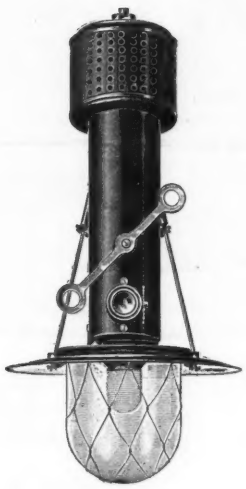

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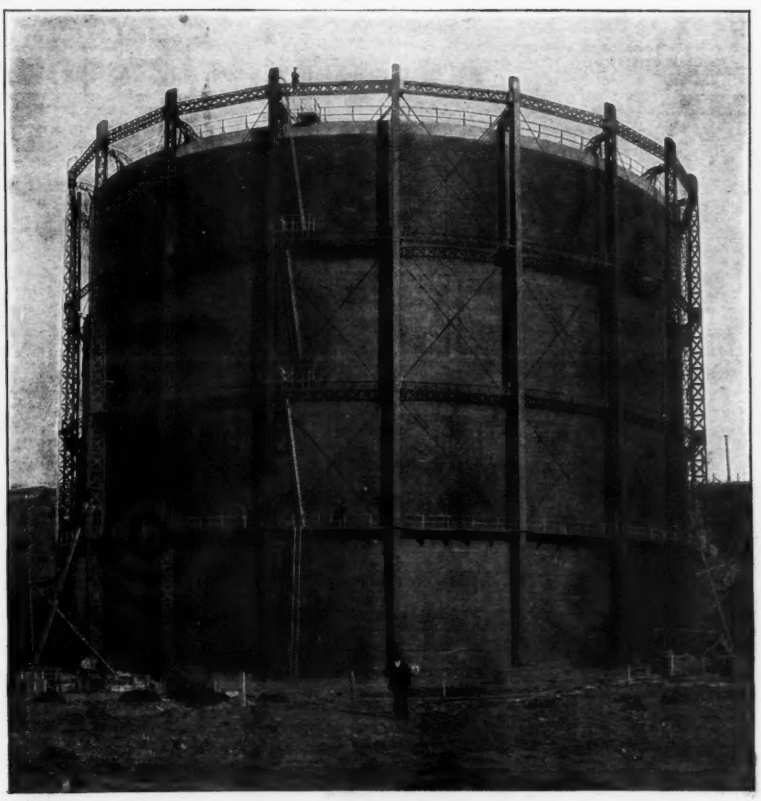

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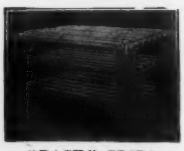

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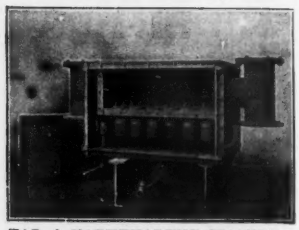

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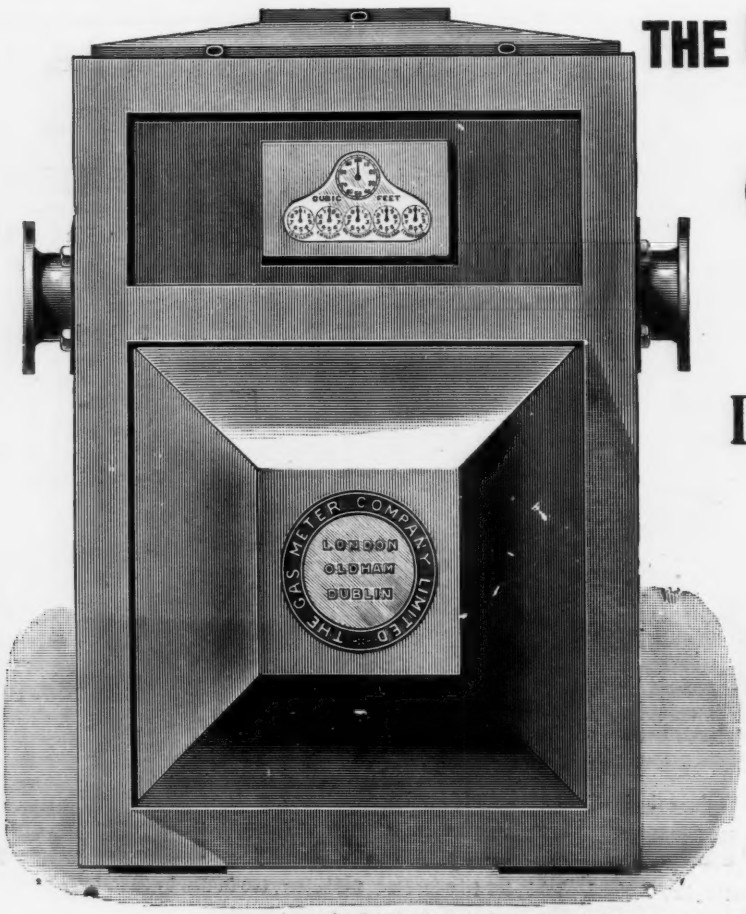

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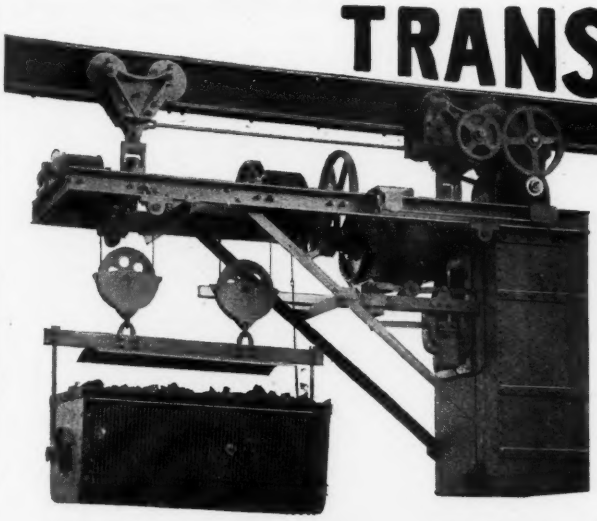

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Courtrai, Belgium	250,000	Malmö, Sweden	350,000	Tottenham (3rd)	350,000
Coventry	600,000	Malta	400,000	Tottenham (4th)	1,000,000
Coventry (2nd)	600,000	Manchester	3,500,000	Tottenham (5th)	1,000,000
Cracow, Galicia	200,000	Manchester (2nd)	3,500,000	Tottenham (6th)	1,250,000
Cracow (2nd)	200,000	Marlborough	100,000	Tunbridge Wells	1,000,000
Crefeld, Germany	500,000	Mayence, Germany	700,000	Utrecht, Holland	1,000,000
Croydon	1,250,000	McKeesport, Pa.	500,000	Utrecht (2nd)	1,000,000
Croydon (2nd)	625,000	Merthyr Tydfil	300,000	Verviers, Belgium	1,000,000
Croydon (3rd)	625,000	Middlesbrough	1,250,000	Vienna	3,500,000
Croydon (4th)	550,000	Namur, Belgium	175,000	Vienna (2nd)	2,500,000
Debreczin, Hungary	100,000	Nelson	400,000	Waltham	400,000
Deventer, Holland	150,000	Newburgh, N.Y.	600,000	Wandsworth & Putney	1,800,000
Deventer (2nd)	200,000	New York	5,200,000	Watford	300,000
Dorking	150,000	Nictheroy, Brazil	250,000	Watford (2nd)	350,000
Dublin	2,000,000	North Middlesex	150,000	Wellington, N.Z.	350,000
Dublin (2nd)	2,000,000	North Middlesex (2nd)	200,000	West Bromwich	550,000
Dublin (3rd)	650,000	North Middlesex (3rd)	75,000	West Ham	1,500,000
Dundee	1,500,000	Norwich	1,000,000	West Ham (2nd)	800,000
Dunedin, N.Z.	150,000	Norwich (2nd)	300,000	Weston-super-Mare	350,000
Dunedin, N.Z. (2nd)	275,000	Norwich (3rd)	500,000	Weston (2nd)	350,000
Durham	200,000	Nottingham	1,000,000	Wexford, Ireland	100,000
Düsseldorf, Germany	1,000,000	Nottingham (2nd)	1,000,000	Wiesbaden, Germany	850,000
Eastbourne	1,250,000	Nuneaton	125,000	Winchester	225,000
Edinburgh	2,000,000	Oberhausen, Germany	175,000	Winchester (2nd)	125,000
Epsom	225,000	Oldenburg, Germany	200,000	Wolverhampton	1,500,000
Epsom (2nd)	300,000	Ostend, Belgium	100,000	Zwolle, Holland	200,000
Falmouth	150,000	Ostend (2nd)	200,000	Zwolle (2nd)	200,000

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KING, EMPEROR, AND PEACEMAKER.

THE whole nation and the whole civilized world to-day unite in a common sorrow. After an all too short but beneficent reign, the august presence, the power for good that was concentrated in the person, of King Edward the Seventh have been removed, with tragic suddenness, from our midst; and, whatever our station and condition in life, whatever our personal interests, there is not one among us who does not feel, and that keenly, an individual loss. In His Majesty we had a man of many parts, which, in their entirety and in their wise exercise, made him stand with due prominence and sovereignty among the heads and rulers of great nations, and gained for him cosmopolitan reverence. His interests and work in human and material affairs, and in the world's affairs generally, reached from the knitting together of nations and the ensuring of universal peace, to the Arts and Sciences of the mighty British Empire, to the well-being of his people in all parts of the world, and to the amelioration of the conditions of the lowliest of those over whom, by God's grace, he was called to rule. He loved his people, and was beloved by them; and the work that he did, and did well, will remain in the nation's and world's history an immortal monument, and an example to his successors and to all men. The promotion of Peace and Goodwill among men and nations was his dominating ambition. He goes from us, from the scene of his great, high, and glorious activities and influences, into the, to the human mind, mysterious Eternal Peace. But the tide of life and of national affairs continues to flow without interruption; and monarch succeeds monarch. King George the Fifth ascends the throne with the loyalty and goodwill of his subjects, the trustee and the instrument of a magnificent power. The times demand from the ruler of the British Empire the exercise of that wisdom, that broad-minded toleration, that aplomb, and that judicial interpretation that were the characteristics of him whose sceptre has now been laid aside. The devotion of King George to Country and Empire was well attested while he was Prince of Wales; and the responsibilities of his high office are recognized by him as a sacred duty. During his reign, which all pray may be long and happy, there is every confidence that, within the latitude of his power, nothing will be left undone by him that will tend to the maintenance of the prestige, the prosperity, and the progress of the British Empire and people.

EDITORIAL NOTES—GAS, &c.

Burner Maintenance.

WHY is it that so much attention is at the present time being directed to the question of the maintenance by gas suppliers of the efficiency of consumers' incandescent gas-burners? There is only one answer; and it is that it is recognized that more real activity in this direction is necessary if the part of the lighting business is to be retained that is represented by those consumers who can afford to have electric light. Nothing is to be gained by blinking the fact. We have, in household lighting, every advantage on our side, but one; and the exception is that incandescent gas-burners do require, to maintain their highest efficiency, more attention than the newer forms of electric lamp, though these are fragile, and have an increasing tendency to blacken. Only occasional attention is required for the purpose of maintaining the efficiency of incandescent gas-lamps; but there are many people—people who will not be bothered, or who are negligent—who will not give to them even the small amount of attention that is essential. That is a plain truth; and it supplies the problem that the gas industry has to face, as to the most effectual means of reducing the disadvantage. The electrical industry have in comparison with gas several disadvantages on their side to meet. But that is their business; and it is the business of the gas industry to see that their gain, through the one disadvantage that gas admits, is kept down to the lowest possible point. There are some gas managers who orally profess that greater activity, or any expenditure on the part of gas suppliers in this direction, is not necessary; but it is abundantly clear that even they have been driven by some power to make a close examination of the question, though not always (it is equally clear) on the broadest lines.

If we grant this one disadvantage, it has to be recognized that among the majority of gas consumers it is enormously outweighed by the pecuniary and other merits that gas possesses; and that it is only the class of consumers who

will not bestir themselves to give the small amount of attention that is required by the incandescent gas-burner, and at the same time are able to afford the cost of electrical installation, of lamp renewals, and of current, whose custom is in any way in jeopardy. This is one of the facts that have to be grasped in considering the position. And, in passing, it may be said that there has not yet been, in examining this question, any well-ordered presentment of fundamental points on which to seriously debate it in its various bearings. There is another consideration that arises from the matter of nomenclature. The wisest among us have developed as a panacea for the single disadvantage what is called "free maintenance;" and those who engage in what is so named at once proceed to falsify the title by giving free labour and charging for the upkeep of mantles and glassware the ordinary retail prices—the profit being set against the cost of labour. By no stretch of the imagination can we bring ourselves to call this sort of thing "free maintenance;" it hardly comes within (more appropriate though it be) the term "free supervision"—a term that was frequently used at the recent meeting of the Eastern Counties Gas Managers' Association, when Mr. F. J. Wimhurst read his paper on the general subject. Let us make our nominal expressions as nearly as possible fit, and be descriptive of, what they are intended to cover; and "free supervision" where labour only is "free" is certainly a more appropriate title than "free maintenance."

This brings us to a further point for consideration; and it is that, while most gas managers agree that there is protective work to be done in this direction, there is little or no agreement as to what should be done. There is much confusion in opinion and practice, which perhaps might be largely composed by comparing the position of electricity with that of gas. Some gas managers are for giving free the labour expended in maintenance and making a charge for mantles and glassware, the profit on which (as already stated) is employed to wipe off some of the expense of the labour. Others prefer a special covering quarterly charge, to include everything. And still others urge that the consumer should be charged nothing, but that the whole expense should be included in the price of gas. The last-named proposal would be unfair as between consumer and consumer; and there are so many considerations affecting it, that for the moment we will not discuss any such extreme measure. As to the other points, the inclusive charge per burner per quarter is the most rational system (in that the consumer knows precisely what he has to pay), did it not make a rather bulky-looking and permanent item in the account of the consumer, and that is a substantial objection. The system of "free supervision" and charging for mantles and glassware at a price that produces a profit, has the objection that many consumers are of opinion that the gas supplier makes "a fine thing" out of it.

In medio tutissimus ibis. Why not let the price of gas bear the cost of supervision; and the material be furnished at absolutely cost prices? This seems to us to be the most prudent course, if gas suppliers are really anxious to do some protecting work in this direction at their most vulnerable point in the composition of their lighting custom. If the consumers are supplied with mantles and glassware at prices below those at which they can purchase elsewhere, then they will at once feel that there is something genuine about the interest of the gas supplier, and that that interest does not resolve itself (as many think now) into a mere profit-making device. This might bring some gas suppliers—more particularly municipal gas departments—into conflict with local tradesmen; but necessity in such a matter as this must override private interests. The maintenance of the lighting efficiency of consumers' incandescent gas-burners is as necessary to-day to the success of the lighting business of the gas industry as is a gas of a fairly good calorific power; and, this being so, the best means to the end must not on any account be allowed to be overridden by outside hostility. In regard to the charging for mantles and glassware (providing the drawback of profit-making is eliminated), that is not a disadvantage in comparison with electric lighting. Actually, mantles and glassware for properly maintained gas-burners of an illuminating power equivalent to any specified metallic filament lamps, work out cheaper than the renewal costs of the latter; and until the electricity industry gives its patrons their lamps free, there is no call upon the gas industry to contemplate any such action as secreting the cost of these in the charge for gas. Besides this, the expense of lighting by incandescent gas-burners—including installation, mantles, and glassware—is, in the end, much cheaper than was lighting by gas in the days of the flat-flame burner. Not only was the consumption then heavy, but the prices of gas (generally speaking) ruled at much higher levels than they do to-day. With properly maintained incandescent burners, too, we can run them and waste the gas for a long time before the cost reaches that of electric lighting by the metallic filament lamp for a shorter period—illumination being equal during the time of use.

There are other points to be dealt with in connection with this very live and controversial question; but we will reserve them for another article.

British Enterprise in Continental Gas Supply.

It must be a matter of some difficulty for those proprietors of the Imperial Continental Gas Association who have not taken anything more than a superficial interest in its affairs, and have had their concern chiefly centred upon the half-yearly dividend, to understand the numerous organic and financial changes—particularly in the latter respect in the items of the balance-sheet—that have occurred in the big undertaking, albeit no one could be more explicit and practical in his explanations than is the Chairman (Mr. J. Horsley Palmer) in his addresses to the proprietors. On the occasion of the meeting last week, the proprietors were met with what looked much like a decline in the profits, and with some remarkable variations in certain of the items in the balance-sheet. The former was due entirely to the merging of the Frankfort business in that of the Frankfort Gas Company, and to the practice of that concern, in common with most other Continental undertakings, of only paying dividends annually. By this change the Imperial Continental Association have become the predominant partners in the concern composed of what were formerly separate undertakings; and the Association's Frankfort capital is now entered up in the balance-sheet as an investment. This is the simple explanation; and much the same would apply to the French part of the Association's business, which, it will be remembered, was converted into an entity apart from the Association, and is now to all intents and purposes (where the major part of the capital comes from does not matter) a French concern, managed and conducted on French soil, and complying with the French law. The Association have in the past, purely for protective purposes, entered into a good many other investment and purchase transactions. Diplomacy and protection are inseparable concomitants in the administration of the concern; and the trend of events on the Continent makes the diplomatic part a greater essential than ever. In carrying out enterprise abroad, British capital has ever been in the forefront; and the success has had the double effect, in regard to the near Continental countries, of creating both envy and imitation. The latter may be the sincerest form of flattery; but the former requires very gentle handling, having regard particularly to the situation of the enterprise. The result is that British enterprise in Continental countries has—we are not referring more to gas than to anything else—to, as it were, nationalize itself as much as possible at the seat of active operations. British gas suppliers on the Continent have done this. They have not abused their privileges; they have laboured under rigorous conditions and heavy local financial obligations; they have had regard for national sentiment; and they have shown their sympathy—and in material manner—at all times and on all occasions when there has been national distress. All this has been fully recognized and appreciated; but gas suppliers, like others engaged in enterprise abroad, have to bow to the common will and law.

But with such change, the prosperity of the Association is not impaired. It cannot be expected that high-water mark will be reached year after year without intermission. That would be neither precedented nor natural. Last half year the increase in consumption was at the rate of 5 per cent. over the whole of the Company's operations. With the great advance in the business in recent years, the reduced rate of increase in a half year is not a matter that should even draw comment. A fine, warm autumn, the Chairman says, had a brake effect upon the progress of the increase; and we have no doubt, too, that the continued rapid advance in the use of the more economical inverted gas-burner has had some effect in stripping off some of the top part of individual consumption. We should like

Mr. Palmer to look at this matter of percentage increases another way; and tell us what 5 per cent. increase in the gas business represented in volume on the consumption of ten and twenty years ago, as compared with that of to-day, making allowance, of course, for the stations that have been severed from the main body. The proprietors we rather think would be very gratified with the result of the exercise. Apart from the reduced rate of increase, the connections of the Company continue to multiply in most luxuriant fashion. Another feature of the half-year's working was the poorness of the coke market; but the Chairman is too old a gas administrator, and has had such a large experience of the peculiar characteristics of this market—knowing full well, too, that the same conditions that govern the coal market rule that for coke—to feel any alarm at drooping prices and mountainous stocks. Of domestic and personal interest at the meeting was the reference to official jubilees in the service. There has been one this year; making up to six the list of retired officials who have served the Association half-a-century. There will be another jubilee to celebrate next year—that of Mr. Salamons, the Association's Chief Engineer at Brussels; and so well known and so well esteemed is he in professional ranks at home that many (we feel sure) will, in due season, be the congratulations that will pass from this country to the scene of long years of faithful labour in the capital city of Belgium.

Resistance Justified.

THE report that Viscount St. Aldwyn has made to the President of the Board of Trade (the Right Hon. Sydney Buxton) on the result of his inquiry into the schedule of maximum (London) port rates on goods, fully exonerates from any obstructionist or vexatious action those objectors who appeared before his Lordship. Not in all cases, but in several, objection was laid on public grounds, as well as advanced in the name of industrial interests. It is quite clear that his Lordship is of opinion that the Port Authority took a very expansive view of their powers in framing the schedule of maximum rates; for he deliberately says that he is satisfied that the maximum rates submitted to the Board of Trade were, in very many cases, unnecessarily high. Although the greatest care was taken to get together an authority fairly well representing in its composition the numerous interests concerned, at the very outset the members took the greatest liberty with the powers conferred upon them. Of course, the answer will be that, in view of the fact that they were (so to speak) exploring new ground, they wanted to have ample resources; and that there would have been no countenancing of hardship on their part that would have worked any ill on the trade of the port. On the other hand it is necessary for traders—such as the gas companies—to know as nearly as possible where they are, and not be perpetually labouring under depressing uncertainty as to whether or not port dues are going up. Early in the inquiry, Lord St. Aldwyn expressed his dislike of too large a margin between actual and maximum rates, inasmuch as the greater that margin the greater the uncertainty. The issue of the investigation makes it quite plain that in some respects the Port Authority made a false start in framing their maximum rates schedule; and this may have some effect in undermining future confidence.

Among the numerous objectors and bodies representative of commerce and shipping were the Gaslight and Coke Company, the South Metropolitan Gas Company, the Commercial Gas Company, and the Brentford and Wandsworth Companies. The oil industry and trade, as well as the users of the residuals of gas manufacture—such as tar distillers, chemical manufacturers, and cement makers—were also influentially represented as objectors at the inquiry. But attention may here be confined to coal. When it was originally seen in the schedule of maximum rates submitted by the Port Authority to the Board of Trade that the proposed rate on coal, culm, patent fuel, and coke was 6d. per ton, and on coal dust and cinders 3d. per ton, this naturally created widespread alarm. But it was not observed that the coastwise maxima were to be half of the maxima in the schedule; so that the 6d. and the 3d. would, on the coastwise trade, have been 3d. and 1½d. It is to the interests not only of London but of the trade of the port itself, that coal should not have a heavy rate imposed upon it; and Lord St. Aldwyn has recognized this by reducing the maximum rate to 2d. per ton. During the inquiry it was repeatedly asserted by representatives of the Port Authority that, generally speaking, the actual rate charged would not exceed half the maximum. If this applies in practice to the reduced maximum, then it means that the actual rate will be 1d. per ton. It is estimated that, at 1d. per ton, the yield of coal alone passing through the port would be £33,000 to £35,000. Last year the five Gas Companies who appeared as objectors carbonized no less than 3,236,646 tons of coal, excluding oil. If this coal is all brought into London *viâ* the Thames, the port rate at one-half the new maximum will amount to £13,486 a year; and, if the maximum rate be charged, to close upon £27,000. This may not mean much per 1000 cubic feet of gas sold; but these increments of rate imposition make larger the already heavy burden upon the commodity, and so are not conducive to lower selling prices.

The Technical Attraction of Sunderland.

ONLY formal business, with a single exception, occupied the members of the North of England Gas Managers' Association at their meeting at Sunderland on Saturday. The exception was the consideration of the question of the formation of a Special Purposes Section in connection with the Association, to deal with such matters as may be deemed desirable by the members. This is a project the President (Mr. T. H. Duxbury) put forward in the luminous address with which he inaugurated his year of office. The indifferent and the drones of the gas industry (and there are such) may be quite content to let mutation have its own way without taking any steps to change their own course, and to continue to apply the methods and prescripts of the past to altogether new conditions of things. That will not do. It is a losing game; and there is disaster at the end of it. We are with those who look the circumstances of modern development fairly and squarely in the face, and see in them sufficient not only for individual mastery to the uttermost point, but for collective consideration and action. Changed condition in the industry is presented to us in so many forms that it cannot be expected that any one person is, unaided, capable of encountering and becoming master of it all; and therefore any action in combination, such as this Special Purposes Section as proposed by Mr. Duxbury, is welcome. As the result of their brief deliberation over the matter, the members assented to the proposed extension of the Association's activity and usefulness.

There was no prepared technical matter before the members; but all they required in the technical line was, in more concrete form than could have been offered by the most carefully written paper and the most fluent oratory, found at the Ayres Quay Gas-Works of the Sunderland Gas Company, invitation to which was extended to the members by the Directors and their Engineer (Mr. Chas. Dru Drury). As our pages have shown by illustrated description, the Ayres Quay Gas-Works have been entirely rebuilt to the plans of Mr. Drury; and there are several novel features about them, which are partly due to the peculiar character of the site. But the most pronounced novelty is comprised in the bench of six settings of ten vertical retorts on the Dessau system—the first erected in England—and we opine that Sunderland will in consequence, for some time to come, be a sort of Mecca for British gas engineers. The members were heartily complimentary to the Directors and Mr. Drury not only for the privilege of being allowed to inspect the new plant, but on account of their enterprise in making this complete departure, in the case of one entire works, from old style to new style carbonization. A new plant of the kind could not require any more favourable quarters than these in which to have its capabilities proved; for with no other carbonizing plant about the place, and all the auxiliary apparatus being on the ordinary working scale, there cannot be any question as to the accuracy of production results. That the visitors on Saturday were favourably impressed with the working of the new carbonizing plant was obvious, as was also the fact that the interest afforded them by it, and the constructional work of Mr. Drury generally, was of the kind which is much to the liking of all professional men enamoured of their work.

Livesey Memorial Fund.

We are coming to the end of the final arrangements for the establishment, in fulfilment of the objects of the Livesey Memorial Fund, of the Gas Engineering Professorship at the Leeds University. To consider this matter and receive their report, the Committee of the Memorial Fund have called a meeting of subscribers

for the 18th inst. at the hall of the Institution of Mechanical Engineers. From the statement accompanying the notice of meeting, it is seen that the total contribution to the fund (including interest) is £10,736 19s. 9d.; while the deductions in the way of expense amount to only £48 5s. 1d. So that £10,688 14s. 8d. remains for investment. There were 605 subscribers altogether, made up as follows: 14 Subscribers, Institution (Birmingham Medal Fund), District and Junior District Gas Associations, £342 1s. 6d.; 228 Members of the Institution of Gas Engineers, £946 10s. 7d.; 160 Gas Companies, £7102 3s.; 24 Gas Committees of Corporations, £540 16s.; 55 Members of the Society of British Gas Industries, £538 1s.; 29 Other Manufacturers, Coal Owners, &c., £308 13s.; and 95 Other Subscribers, £745 3s. 6d. The two largest subscribers were the South Metropolitan Gas Company (£2000) and the Gaslight and Coke Company (£1000).

The Coalite Patents and Position.

Confidence seems to be absolutely shattered in the Coalite Syndicate and the British Coalite Company. The shares continue to shed fresh parts of their market value; and the claims of the promoters have their foundations rendered more and more insecure as time passes. It was a significant piece of news that the "Iron and Coal Trades Review" published recently (and which was reproduced in our news columns last week), to the effect that the Coalite Company had been unsuccessful in defending what they are pleased to regard as their master-patent by opposing the application of a Glasgow Syndicate for a patent for producing—presumably by a low-temperature process of carbonization—a smokeless fuel. The stupid pretensions of the Coalite people in respect of a monopoly for the production of a sort of half-carbonized coal are thus knocked on the head. Before any claim to monopoly could be maintained for the degree to which carbonization is carried out, all the governing parts of our patent laws would have to be relinquished. There were rumours, too, in the City last week as to a number of men having been discharged from the Barking works. But according to Sir William H. Preece, the Chairman of the British Coalite Company, the men have only been temporarily suspended while the gas-producer plant is being coupled up to the new batteries there. The men, it is learned from the same source of information, are engaged in the installation of electrical plant at the works, from which plant, we are told, the various districts for miles around are waiting to be supplied with electricity as soon as the Coalite Company can meet the demand. We have been taught by a very large experience to considerably discount Coalite statements; and as we look at the statistics as to existing electricity plants and supply in the districts for miles around Barking, the question naturally arises, Is the statement true as to this demand for electricity actually waiting for the Coalite Company to be in a position to meet it? The information on this point is published by the "Financial Times;" and it occurs to us that perhaps the reporter did not correctly catch what Sir William Preece said at the interview with him.

The Weekly Rest-Day.

The very good principle of "one day's rest in seven," as bearing on their own employees, has been receiving a considerable amount of attention at the hands of the Nottingham City Council. Some months ago, a resolution was passed in favour of the adoption of a scheme which would embody the idea of a weekly rest-day; and the Committees were instructed to make arrangements accordingly. At a meeting of the Council last week, three of the Committees presented reports on the matter; and from these it was seen that the passing of the resolution by the Council in favour of the scheme was not by any means the only thing required to bring it into successful action. It was stated that the scavengers and lamplighters had presented memorials against the new arrangement, and asking that the previously existing conditions of work and pay should be reverted to; while the Gas Committee intimated that they found themselves unable to carry out the resolution, "unless the Council were prepared to take the risk of voting in opposition to the wishes of the general body of gas workers," who were opposed to any system which would entail their rest-day being any other than Sunday. A joint motion of the three Committees referred to (the Gas, the General Works and Highways, and the Lighting Committees) rescinding the resolution of the Council in favour of the scheme was moved; and it was pointed out that a great number of the men worked only part of Sunday (and received only part of a day's wage); and the compulsory rest on a week-day meant a greater loss to them than when it fell on a Sunday. The men did not want the scheme, urged the mover of the resolution; all they asked was to be "severely left alone." An amendment was then moved to the effect that a Special Committee should be appointed for the purpose of ascertaining the best means of carrying out the Council's original resolution respecting one day's rest in seven for employees, without involving any reduction of wages to those who at present receive less than 6d. per hour; and that the various Committees should be directed to see that no employee suffers loss of wages pending the report of the Special Committee. One member said the scheme was introduced for the benefit of the men, both from the spiritual and the physical standpoint, and to solve to some extent the question of unemployment in the city; and he instanced the carbonizing department of the gas-works to show how under the scheme sixty additional men would be required during the winter months, or thirty throughout the year. From all this, it seems that the Council are desirous of looking after the spiritual and physical welfare of the men, but that the men are unwilling to bear the cost of the treatment. The question thus apparently resolves itself into one of whether the Corporation themselves are prepared, on behalf of the ratepayers, to bear the expense of putting into practice the principle with which they have already expressed agreement. More will doubtless be heard of the matter, as the amendment for the appointment of a Special Committee was carried—without, however, the portion referring to the question of wages.

The Birmingham Appointment.

The Gas Committee of the Birmingham Corporation decided yesterday to recommend for appointment as Secretary and Manager of the Gas Department, at a salary of £1000 a year, Mr. R. S. Hilton, at present Manager of the Clay Cross Coal and Iron Works, near Chesterfield.

A Libel on the Gas-Cooker.

Mr. W. Shaw Sparrow—we do not know the gentleman—has written a book entitled "Hints on House Furnishing," and extracts have been appearing in a magazine called "The Household." We have not Mr. Sparrow's book by us, so we cannot form any opinion as to his general knowledge on the subject on which he poses as an authority. But there is one respect in which an assertion is so faulty and, in fact, without foundation, that we can only declare that, concerning this particular point, he knows nothing whatever—assuming, of course, the sentence referred to in "The Household" is an extract from his book. It reads: "Then, as regards the use of gas for cooking, most families have tried it in towns, but not with encouraging results." The statement, it is general knowledge, is so untrue that it does not require the material evidence of statistics as to the continuing popularity of the gas-cooker to disprove it.

Reference has already been made in the "JOURNAL" to the Engineering and Machinery Exhibition which the proprietors of "Engineering Review" are making arrangements to hold in Manchester from Oct. 14 to Nov. 5 next. Among the numerous patrons of the Exhibition are several whose names are familiar to our readers—Sir Alexander Binnie, M.Inst.C.E.; Mr. J. A. F. Aspinall, President of the Institution of Mechanical Engineers; Dr. Gisbert Kapp, President of the Institution of Electrical Engineers; Mr. James Swinburne, F.R.S., Past-President of the Junior Institution of Engineers; Mr. W. H. Prescott, Assoc.M.Inst.C.E., President of the Institution of Sanitary Engineers; and Captain H. Riall Sankey, Mr. Michael Longridge, Dr. Edward Hopkinson, and Mr. Dugald Clerk, who are well known for their work in connection with the gas-engine.

Dr. J. B. Readman, of Edinburgh, communicated to the Royal Scottish Society of Arts, at a recent meeting, some results obtained by him on a motor-car with different liquid fuels. In order to render the trials as closely comparative as possible, he selected the high road leading from Penrith to Appleby, a portion of which was believed to be one of the best roads in England. The trials were always from the same place and proceeding in the same direction; and the series of experiments were all carried out on one day. In every case one-fifth of a gallon was introduced into the experimental tank. The unmixed fuels used were: (1) Shell petrol, as a standard well-known fuel; (2) 90 per cent. benzol, sp. gr. ·880 (engine very difficult to start when cold); (3) shale motor spirit, sp. gr. ·704 (engine started readily); and (4) shale naphtha, sp. gr. ·740 (repeated trials proved that the engine started fairly readily with this spirit, even when all was cold). The fifth fuel was a mixture of 50 per cent. benzol, sp. gr. ·785. The results showed that the miles per gallon from each of the fuels were respectively 18·3, 20·7, 18·1, 18·8, and 18·7. There was no smoky exhaust from any of the fuels; and the engine pulled well with all except the naphtha. The author pointed out that benzol gave the best results; but the difference was not so great as he expected.

GAS STOCK AND SHARE MARKET.

(For Stock and Share List, see p. 387.)

THE Stock Exchange was closed on Monday—as usual on the first working day in May. Re-opening on Tuesday, the dominant feature was the considerable fall in the Rubber Share Market. This was in part the result of reaction from the previous boom, but more largely from the unexpected line taken by the market for the article produced. Other speculative lines were depressed to some extent; but the leading departments were not affected. Indeed, Government securities were strong; Consols rising ⅛ for money and ½ for the account. Wednesday was more cheerful—being much relieved by the cessation (even though it might be no more than a postponement) of collapse in Rubber. Consols advanced another $\frac{3}{16}$. Railways were firm, and all the big markets were more or less improved. The brighter tone was confirmed on Thursday; the special settlement in the Rubber Companies shaping satisfactorily. But Consols were dullish on the Bank returns; and buyers lowered their price ⅛. The other leading departments, however, were quite good. On Friday, the opening was clouded by fears engendered by the bulletin of the King's health. In a state of uncertainty and apprehension aroused by the wholly unexpected intelligence, dealers could only lower prices, and, indeed, in some lines dealings at all were hardly to be done. The alarm abated somewhat before the close, in the absence of a further bulletin, upon which fact the best construction was put. On Saturday, the Stock Exchange was closed, in mourning for our dead King—a Ruler of rare sagacity and that sense which transcends genius—hereafter in all hearts Edward the Wise! The Money Market was placed in a position of extreme ease at the beginning of the week by a great influx of gold; but it subsequently became firmer. Business in the Gas Market was only moderate, and quite devoid of interest. The universal characteristic was steadiness free from any motive power to change. In the whole list of quotations—whether in London or in the Provinces—there was only one variation, and that was an *ex div.* adjustment. In Gaslight and Coke issues, the ordinary realized the same prices as in the week before—viz., 103¼ to 104¼. In the secured issues, the maximum made 89⅜, the preference from 104½ to 105½, and the debenture from 81⅜ to 82½. South Metropolitan was quiet at from 120¼ to 121¼, and ditto debenture made 81½ and 82. Commercial 3½ per cent. changed hands at 103. Among the Suburban and Provincial group, Alliance and Dublin was done at from 82⅞ to 83½, Brentford new at 188, Brighton original at 215½, British at 44, South Suburban at 121¼, Wandsworth "B" at 139½, Liverpool "B" at 164½, and Sheffield "C" at 234. In the Continental companies, Imperial marked from 181¼ to 182½, Union from 98⅜ to 99¼, European 24¼, and Tuscan debenture 100¼ and 100¾. Among the undertakings of the remoter world, Hong Kong made 17⅜, Monte Video 12⅞ and 13$\frac{3}{16}$, Primitiva 7⅜, ditto preference from 5⅜ to 5⅝, and San Paulo 15⅝.

ELECTRICITY SUPPLY MEMORANDA.

Unrest in the Electrical Industry—The Influence of Possession—Flame Arc Street Lighting—Company Finance—The Burden of Faversham—A Truly Rural Venture.

THE question of public street lighting has waxed in strength; and all through the Westminster lighting contract having been won by the Gaslight and Coke Company. Our friends of the electrical press are torturing themselves needlessly in trying to mend the injury that they confessedly feel has thereby been done to the electrical industry. The mass of flabby assumption that has been presented to the readers of these papers is wonderfully amusing; the sympathy one minute for the Gaslight Company and the abuse that, the next minute, is showered upon them is distinctly of the same order; the mixture of sympathy with, and abuse of, the St. James' and Pall Mall Electric Supply Company is in character with the rest; and so are the things that are said about the Westminster City Council. The electrical defeat fairly haunts those whose duty it is to speak for the electricity supply industry; and the result is the wordy exhibition that has been witnessed. The presumption of our journalistic friends in believing that they know more about the Gaslight and Coke Company's business than that Company know themselves, has been a matter upon which there has been previous remark in these columns; and there has also been in these columns a suggestion that there should be fair and square contemplation of current facts, and not misleading constructions placed upon historical figures that have no application to the latest accomplishments of high-pressure gas lighting. But nothing that has been said has altered the electrical method of dealing with this question. The Gas Company are still accused of "taking a leap in the dark, and trusting to luck to pull them through." The prices and photometrical tests of the Kingsway lamps (which have no relationship whatever with the latest high-pressure achievements) are taken as the impassable zenith in economy and efficiency of gas lighting. But when the candle power obtainable from a cubic foot of gas is doubled, when a single inverted burner and mantle can be made to give a constant 1500-candle power, and when by the inverted mantle greater illuminating efficiency can be obtained in the directions wanted, it must be apparent to the simplest mind that the bases of past comparison no longer hold good. Mr. J. W. Bradley, the City Engineer of Westminster, would be the first to acknowledge that, when his latest photometrical tests were published, he had not tested photometrically (as he has since done) the high-pressure lamps in Fleet Street. It is also clear our friends of the electrical press have yet much to learn as to the principles of photometry, and as to the question of effective illumination from different lights at given heights and measured at certain points. But why not let the matter rest now? If all they say is true, there is a day of reckoning coming for the Gas Company. Let the electricians go along confidently and complacently in the belief that the Gas Company have done something at much below cost price (a thing that, of course, an electrical undertaking never did). The elation now will swell to magnificent triumph later on; for do they not see that the illumination contracted for is going to be tested photometrically at certain points, and there is a heavy penalty attaching to deficiency. Electricians are fully persuaded that gas cannot be kept up to any definite standard of illumination; and so they may contemplate with the pleasure of anticipation, which will be nothing to the ecstasy of realization, the Gaslight and Coke Company receiving nothing for the lighting of Westminster after the penalty deductions have been made. Happy ratepayers! happier electricians!! Now do rest peacefully for a time.

Possession has no doubt a big influence in the matter of decision, though the decision may not be the best thing that could happen in the interests of the greater number. The remark applies to this street-lighting question. There is little reason to ask why it is that in the areas where the electricity undertaking is under municipal control, electric lighting should bulk so largely in the streets; while in those areas where gas and electricity are both under the direction of companies, gas succeeds in retaining its pre-eminent position. The City of Westminster contract shows that gas economy and merit can win where there is not the prejudice born of possession; and the same may be said in connection with the frank and independent report of the deputation that the City Corporation commissioned to investigate the matter of modern public lighting. In those boroughs of South and North London where electricity is supplied by companies, gas also holds its own. That is an answer to the growl in one quarter (provoked solely by the Westminster street lighting contract) that "the time has gone by when street-lighting contracts are settled by a sort of independent competitive examination; they are being settled now by the methods of unscrupulous rivalry, and it behoves the electric supply companies to make the fact apparent." In the gas industry municipal electricity supply tactics have long since made that "unscrupulous rivalry" felt, and felt seriously. In another source of electrical information, we read in a notice of a meeting of the Hampstead Borough Council (who are the owners of the electricity undertaking) that "the Lighting Committee have had under consideration an amended offer from the Gaslight and Coke Company for the improvement of the lighting of the street lamps. A motion that the work of converting the gas-lamps into electric lamps, as already decided upon, be deferred until the amended offer is considered was negatived." This may be left to speak for itself. The interests of the ratepayers may go to the wall, so long as those of the electricity undertaking are served. So men placed in positions of trust by the ratepayers are influenced by possession; and economy and efficiency of service are considerations that are now shelved and forgotten.

Street lighting by flame arc lamps is not progressing; and it is not surprising owing alone to their inconstancy. Illumination authorities, assembled in the hall of the Society of Arts, under the auspices of the Illuminating Engineering Society, have told the lighting world that they have the greatest possible difficulty in getting an illuminating curve for arc lamps owing to the fluctuations of the light. Mr. Bradley, the City Engineer of Westminster, has likewise found some difficulty with the measurement of the arc lights in the area under his control. Another cause for the want of progress of flame arcs is the (unless the lamps are placed close together, and this is costly) big variation between light and shadow on the surfaces of the roads; and still another is the advent of the high-power metallic filament lamp. Now the makers of carbons for flame arcs appear to be putting another obstacle in the way of the lamps by raising the prices of the carbons. The Hackney Borough Council have learned from their Electricity Committee that they have examined eleven tenders for 80,000 yellow flame arc lamp carbons; and the prices range from £5 15s. to £4 5s. per 1000 pairs. The highest price in the past has been £3 12s. 6d. It appears to the Committee that an attempt is being made to force up the price of flame lamp carbons; and they have therefore decided for the present to buy in the open market as current requirements demand.

From time to time at Local Government Board inquiries, loud have been the complaints made of the crooked accountancy of councils in connection with their electricity concerns; and we know, from an examination of the accounts of certain electric light companies, that their financial methods cannot be held up as spotless. This matter so far as companies are concerned is of vital importance to local authorities, in view of their purchase powers under the General Acts. At the instance of the Camberwell Borough Council, Messrs. Deloitte, Plender, Griffiths, and Co., have been making an investigation of the accounts of the London Electric Supply Company; and their report is not altogether satisfactory, intimating as it does that the accounts are kept with a greater regard for the present than for the future. And it is the future with which the Borough Council are most

concerned. It is alleged that the accounts do not conform with Board of Trade requirements. The Auditors are not satisfied that certain outlay charged to capital account is expenditure within the meaning of the Acts. The question of the advisability or otherwise of salaries and wages being charged to capital has frequently been raised in relation to municipal electricity supply; and here we have the Auditors suggesting that the method employed by the Company in charging certain portions of salaries to capital account is questionable, inasmuch as its application may have resulted in amounts which are materially disproportionate to the cost of the time occupied in connection with the expenditure upon particular assets. In view of the ultimate transfer of the undertaking, the question of proper provision for depreciation, repairs, and renewals is of considerable importance; and the Auditors do not consider the Company have taken a sufficiently broad view in this matter. But the General Manager of the Company, in answer to this, says that, "having regard to the existing conditions affecting electrical enterprise generally, and the present circumstances of the undertaking, considered in conjunction with the Company's proposed policy in relation to the future as regards the question of providing for depreciation," he regards the provision made to the date of the Auditor's examination as "reasonably sufficient." Among the recommendations of the Auditors is one suggesting that the revenue account should be divided so as to show separately the receipts in respect of power; and this requirement, it is submitted, is reasonable, having regard to the powers of the local authority under the special purchase clause of the Camberwell Provisional Order. The London Electric Supply Company's accounts are not worse, but much better, than many other electricity companies can show; and we have only referred to them here as an illustration, in view of the comments upon them of a firm of Auditors of high repute. It is clear that not only the accounts of municipal electricity concerns, but those of companies, require overhauling, and placing beyond suspicion on a sound foundation.

Representative of numerous other electricity undertakings operating in provincial towns is that of the Faversham Borough Council, whose accounts are before us from the date of formation to March 31, 1909. It is a sorry tale that the accounts present. From the outset, with a revenue making snail-like progression, things have been going from bad to worse in the final annual result; and we fancy the ratepayers must be heartily sick of the white elephant which their ill-advised representatives provided for them a few years ago. If we take the accounts for the year ending March, 1906, and compare them with the year ending March, 1909, it is seen that the capital account has grown, by £3789, to £24,179. The revenue from private consumers of electricity has only in the four years advanced by £377, to £1058; and public lighting (with a total of £712) has put on £55. Whereas the total revenue (£1860) only exhibits an increase of £576, the total expenditure on revenue account (£1821) has risen by £945. Strange as it may seem, it would have been far better for the undertaking and the ratepayers if the conditions of 1905-6 could have been stereotyped; for then an amount of £508 was transferred to the net revenue account, but since then 1906-7 has yielded only £197, 1907-8 £223, and 1908 9 £39. It is hard that the ratepayers of a town like Faversham cannot be protected against the prophetic representations, which time proves to be misrepresentations, and against the speculative propensities of a gullible Council. Since the concern started five years or so ago, the ratepayers have had to provide (only £90 short of) £5000, to meet the financial obligations of the concern—that is to say, the ratepayers have actually provided in support of the undertaking upwards of £800 more than the total receipts for electricity from private consumers, and have during the same period paid £3300 for public electric lighting. Therefore altogether the ratepayers have up to March, 1909, financed the electric light undertaking to the extent of £8300. And, to make matters still worse, under the heads of sinking fund account and reserve fund account, the word "*nil*" appears; and depreciation is going on day by day. If it is any consolation to the ratepayers of Faversham, it may interest them to know that they do not stand alone among communities that have been electrically deluded.

This Faversham experience reminds us of a recent announcement regarding the formation of a Company to carry on the business of rural electricity suppliers. Notwithstanding the fact that the Company propose to use gas or oil engines for generating purposes, we shall not feel inclined to participate in the scheme as investors, or to advise anyone else to do so. It is stated that the Company intend to operate without parliamentary powers, and to use overhead distributing mains. This sort of thing may seem enterprising to some people; to others it may seem something else. We can quite understand that while a writer in the "Industrial Supplement" of the "Electrician" wishes the venture every success, he prays that the promoters may order their steps carefully at first (we take it that afterwards care will not matter), and to choose with discrimination the areas in which they open their first stations. The advice is timely, and should be seriously taken to heart. By the way, talking of new electrical ventures, how is the "Fixed Price Per Light Company" going along in South London?

The spring meeting of the Midland Association of Gas Managers will be held at Smethwick, on Thursday, June 2—the President (Mr. Vincent Hughes) in the chair.

NOTES FROM WESTMINSTER.

THE long-promised spring holiday is now with us—the Budget having been passed and the "Parliament Bill" having seen the light of day. Both Houses have a respite from their labours until Thursday, the 26th inst. Thereafter, we ought not to be long in learning the fate of the Standard Burner Bills, and in seeing through the remaining Gas Bills that are to be opposed in the second House. There are not many of them. To clear up the record of the noticeable work done in the Committee rooms, there are a few notes to be made on some important water schemes.

Aberdeen Water. The Aberdeen Water Bill has been very unfortunate from the time it reached the Committee stage; and it has in the event failed to convince—notwithstanding all the care of Mr. Balfour Browne, K.C., Mr. Honoratus Lloyd, K.C., other Counsel, and a noble army of engineering and chemical experts—a House of Lords Committee as to the soundness of its *raison d'être*. It was a big water scheme that the Bill adumbrated, involving an expenditure of no less than £1,400,000, and proposing a supply from the River Avon—a tributary of the River Spey. The Bill first came before a Committee, with Lord Gorell as Chairman; but when there had been a partial hearing, his Lordship was taken ill, which left the Bill in suspension for some time. Then compassion was shown it; and the Earl of Camperdown, ever compliant in such matters, was induced to take Lord Gorell's place. Matters then proceeded without further hitch, until the end of the Committee proceedings came; and they marked the final disposal of the measure by the simple process of absolute rejection. The Bill was at one time opposed by the Duke of Richmond and Gordon and other riparian owners; but with them terms were arranged. There was, however, an influential section of the ratepayers and manufacturers of the city whose antagonism was unappeasable. They saw no good in the scheme, either from the financial standpoint or in respect of the character of the water; and their advisers were of opinion that an additional supply could be obtained more economically from a source nearer home. No amount of pleading as to the present supply being inadequate or liable to pollution would shift the opposition a single inch from the position that they had taken up. The grandeur of the whole scheme—the possession of a mammoth reservoir capable of yielding 20 million gallons of water a day, and an aqueduct running a distance of 48½ miles—had no softening influence. Opponents were steadfast in their declaration and view that the Council in this matter were not representing the opinions of the ratepayers, and that the scheme was not reasonably necessary. It was a tough fight; and each side was strong in its contentions. But the Bill has sunk, and the scheme has gone with it, by a unanimous decision of the Committee. Whether it will, in some similar form, be revived again remains to be seen. For such a course the great Loch Katrine scheme will perhaps stand before the Aberdeen Council as a precedent encouraging to revival. One point in connection with the decision. The successful opponents asked for costs; but these the Committee refused. The request for costs is of more frequent occurrence nowadays than it was in the past. But, before they will grant them, a Committee require very definite satisfaction that those against whom costs are desired have acted in a vexatious manner.

Domestic Supply. There has been a great deal of difficulty, and more especially of late, as to what of the thousand-and-one uses to which water is applied may fairly come within the definition of "domestic supply." There was the case recently in which the South Suburban Gas Company were concerned in placing the views of the Metropolitan Water Board on a rational basis; and the London, Brighton, and South Coast Railway Company have also experienced difficulty with regard to the supply of water to the lavatories at their West Norwood station. What is chargeable, and what is not fairly chargeable, within the term "domestic supply," has become an extremely serious matter for water authorities. The Bradford Corporation Water Department are among those who have suffered through the absence of a proper definition; and so they determined to put an end to the trouble in the Bill that they have in Parliament this session. A clause was inserted for the purpose, which, to please the Local Government Board, was framed in this way: "No supply of water other than a supply to, or for, the purpose of a dwelling-house, shall be deemed to be a supply of water for domestic purposes." At first the section of the Local Legislation Committee presided over by Mr. Nicholson seemed to think this was more a matter for the general law than anything else; and that the granting of the clause would be looked upon as a precedent. But a clause sufficient to serve as a precedent, and bearing a great weight of years and proved usefulness, exists. After Mr. James Watson, the Corporation Water Engineer had illustrated the experienced difficulties, Mr. W. Terry, General Manager of the Water Department of the Sheffield Corporation, came along, and stated that they have a clause in their Act of 1853 which to some extent defines the line between domestic and non-domestic supply; and it has been a great convenience. The clause defines the supply of water for domestic use to be to the occupier or occupiers of any dwelling-house, or for the purposes of his or their own families' consumption. The Committee were undoubtedly impressed by Mr. Terry's

evidence; and they soon got over the difficulty of creating a precedent (for which they appear to have a great abhorrence) by giving Bradford the Sheffield clause, simply altering in it the word "shall" to "may." Bradford was satisfied; and so were the Committee. It may be expected there will be many other water authorities seeking to become possessed of the same defining clause.

A Joint Water Board. The Rhondda and Pontypridd District Councils are in Parliament with a Bill for the formation of a Joint Water Board, who propose to commence their career by purchasing, for £335,000, the undertaking of the Pontypridd Water Company. Sir Luke White's Committee quickly passed the preamble of the measure, as there was no opposition to it—the fighting all taking place on clauses, when some important decisions were given by the Committee. In the first place, in the Pontypridd Water Act of 1908, the Cardiff Corporation obtained a protective clause in regard to the supply of water within a prescribed area outside the borough boundaries. Now this protection, unless repealed, would have prevented the Llandaff and Dinas Powis Council negotiating with the Water Board for water on the termination of their contract with the Cardiff Corporation. Therefore there was a proposal in the Bill that the 1908 clause should be repealed, in which event the Cardiff Corporation in the outer area would be open to competition. A corresponding case has never been heard of before; and, much to the annoyance of Cardiff, the Committee consented to the 1908 clause being repealed. That was one surprise. Also in opposition were the Llantrisant and Llantwit Fardre District Council; and, at their instance, the Committee agreed to the insertion of a clause enabling them, without coming to Parliament, to purchase, upon giving notice, the distributing portion of the Water Board's undertaking that was in their district—purchase to be by agreement or arbitration. The Committee rather wanted conditions of purchase and supply in bulk to be inserted in the Bill. The parties, however, could not come to any arrangement; so that the clause will remain open for a future tussle, should the Council determine to become their own water distributors.

PERSONAL.

Mr. F. W. Rapkin, the Engineer and Manager of the Dartford Gas Company, on the occasion of his having completed 23 years' service, and in recognition of his interest in the welfare of the workmen, has been the recipient of a beautiful illuminated address, which emphasizes the value of his services in the introduction of the co-partnership scheme adopted last year. The opportunity was also taken to present Mr. W. H. Bennett, the Assistant-Manager, with a smoker's cabinet, suitably inscribed, in view of his approaching departure for Redhill, where he has been appointed Engineer and Manager of the Gas Company. The presentations were made by Mr. J. James, on behalf of the men; and the recipients appropriately acknowledged the gifts.

On a proposal to increase the salary of their Gas Manager, Mr. A. Bromley, from £300 to £350, Alderman Ward, the Chairman of the Gas Committee, pointed out to the Batley Town Council that he was a most efficient official, and for many years there had been handsome profits handed over in relief of the rates; and he said that if Mr. Bromley continued to manage the works as he had done up to the present, the Committee contemplated giving him a further increase of £50, to make his salary equal with that of his predecessor. Alderman Turner moved, as an amendment, that the increase be only £25, in view of the remarks of Alderman Ward. Had it been intended to let the increase stop at £50, he would not have objected; but he did not agree with any proposal to give such a substantial increase as £100 in so short a period. Eventually, however, the proposition was carried.

After twenty-three years of continuous service with the Omaha (Neb.) Gas Company, and after fifty-three years' work with various gas companies, Mr. Isaac Battin has retired, and he and Mrs. Battin will reside in Philadelphia. On account of his long service with the Company, the Directors have given him an indefinite leave of absence; but he will retain the office of Treasurer and Engineer. The Directors passed resolutions testifying their appreciation of his services, and recording that the Company's increased business had been largely due to his energy and integrity. They recognized that by his retirement they were losing a loyal and faithful officer; and they tendered to him their best wishes for a long life, "filled with a knowledge of duty well done." Mr. Battin is the oldest member of the American Gaslight Association, and has a record of service in the gas business probably longer than that of any other man in America.

Mr. A. Canning Williams, the Secretary and Accountant of the Reading Gas Company, was on Monday of last week appointed Treasurer and Collector to the Edinburgh and Leith Gas Commission. The vote was between Mr. Williams and another, and it resulted in favour of Mr. Williams by twelve votes to ten. In nominating Mr. Williams, Lord Provost Brown said they quite recognized that it was consistent with their duty that they should promote someone in their own employment; but they were face to face with this fact—that to the best of their lights they must nominate the best man before them. While they needed a man with good business experience, a man with gas experience was also felt to be desirable. The Sub-Committee came to be of opinion that, in the best interests of the Commission, they had to go outside Edinburgh; and they nominated Mr. Williams, at a salary of £700, which was not a maximum. The impression that got abroad, that £500 was to be the maximum salary, probably prevented some of the best men from applying. Mr. Williams, who has been appointed, began his career in the Gas Department of the Blackpool Corporation (under Mr. John Chew), where he was rental clerk 1882 to 1888. He was then, till 1895, Assistant Accountant to the Scarborough Gas Company; and from 1895 till 1904 Accountant and Office Superintendent of the Scarborough Gas Company. In 1904 he was appointed Secretary and Accountant of the Reading Gas Company. During his tenure of office at Reading, the percentage of arrears has fallen considerably; there has been a reduction in the amount of bad debts; the price of gas has been reduced three times; the reserve fund has been built up from £15,000 to £37,000; and about £81,000 of capital has been raised.

OBITUARY.

We regret to record the death of Mr. Martin Peirce, eldest son of Mr. W. G. Peirce, the Water Engineer to the Corporation of Richmond. Deceased was articled to his father, and was for some years his Assistant. In this capacity he prepared the plans and superintended the work connected with the sinking of the Terrace Gardens well, and was clerk of the works for all the constructional work, well sinking, and adit driving undertaken by the Vestry and their successors the Corporation. He remained in their service till 1902, when arrangements were made with the Southwark and Vauxhall Water Company for furnishing an auxiliary supply of water to the town. Mr. Peirce was subsequently engaged on works in various parts of the country; and finally obtained the position of Resident Engineer of the Bexhill Water and Gas Company, which he filled at the time of his death at the early age of forty-five. Deceased leaves a widow and five children.

The Dutch gas journal, "Het Gas," contains an obituary notice of Heer J. J. Prins van Doesburgh, the Manager of the Gas and Electricity Works at Gouda, who died on April 8, in his 49th year. Deceased received his training as a gas engineer at The Hague and the Rotterdam Gas-Works, then under the management respectively of Heeren J. E. M. Kros and Dr. Th. van Doesburgh, and later at English gas-works. In 1879, when at Newcastle-on-Tyne, he was elected a Member of the Gas Institute. From 1882 to 1884 he was at the Lochem Gas-Works, and then for three years at Dordrecht. In 1887, he was appointed Manager of the Gouda Gas-Works, and when, later, an electricity works was constructed in the same town, he was placed in charge of this also. He took an active part in 1898 in the formation of the South Holland Club of Gas Managers, which was represented, as well as the Association of Dutch Gas Engineers, at the funeral on April 11.

The death occurred recently, at the advanced age of 96, of Mr. James Eaton Robens, J.P., the Chairman of the Weymouth Consumers' Gas Company. The deceased, in association with a few fellow-townsmen, formed the Company now many years ago, and acquired the then existing undertaking; and from the outset till his death his interest in it never abated. He held the chairmanship for a long time; and, notwithstanding his great age, he regularly presided at the half-yearly meetings, at which his statements were always remarkable for their lucidity and for the revelation of the commercial instincts and business qualities with which he had been so liberally endowed. Under his *régime*, the price of gas was reduced from 5s. 9d. per 1000 cubic feet to little more than half this figure. As evidence of his keen interest in the Company, it may be mentioned that though he was unable, owing to ill-health, to be present at the last half-yearly meeting, he sent some observations upon the working of the concern which were read by the Vice-Chairman, who presided. Mr. Robens had had remarkably good health until towards the close of the past year, when he had a severe attack of bronchitis. A few weeks ago he became seriously ill, and died on the 22nd ult. The funeral took place the following Wednesday; and was attended, with other gentlemen representing the Gas Company, by Mr. D. F. Coulson, the Engineer and Manager, and Mr. James Lowe, his predecessor in this office.

Use of Tar on Roads.—At the meeting of the Surveyors' Institution on Monday last week, papers on the construction and maintenance of roads were read by Mr. Richard F. Grantham, M.Inst.C.E., and Mr. W. Menzies. In the course of his communication, Mr. Grantham stated that the cost of tar-spraying, including brushing the road and the sand sprinkled on the tar, varied from about ¾d. to 2d. per square yard. Taking the average width of the carriage-way at 8 yards, this worked out at from £44 to £117 per mile. The cost in some districts was said to have been reduced to from £30 to £40 per mile. Mr. Menzies said the life of a road is greatly prolonged when tarred. He carefully watched two lengths of his roads, one having a granite and the other a flint service, both of which were tarred in 1907; the process being repeated annually. These surfaces were subjected to heavy traffic; and he had come to the conclusion that between 1907 and the present time a saving of something like 9d. per yard super. on the granite and 6d. per yard super. on the flint road had been effected.

THE HAMBURG GASHOLDER DISASTER.

THE accident which befel the two gasholders at the Grasbrook works at Hamburg on Dec. 7 last, with its terrible consequences, is recalled by the official account of it given by the Fire Brigade Committee of the Hamburg Corporation, of which a translation appears below. This account forms part of the annual report of the work of the Brigade, and does not essay to explain why the initial failure of the substructure of the large new gasholder occurred. For an official explanation of the real cause of the disaster, we must apparently continue to wait until the Court of Inquiry which five months ago was commissioned to investigate the matter issues its official judgment or report. We cannot help, however, expressing surprise at the length of time which that Court appears to consider necessary for conducting its investigation and formulating its report.

The Fire Brigade report does not add much to the knowledge of the disaster gleaned from unofficial sources immediately after its occurrence. The number of persons injured, however, is now definitely stated to have been 72, of whom 20 lost their lives. We do not know if there has been any inquiry on the deceased corresponding to the English inquest, and, if so, what was the finding in regard to the responsibility for such terrible loss of life. Probably, however, the result of the technical investigation of the Court of Inquiry already referred to would incidentally carry with it apportionment of responsibility, if any, for the deaths. The Fire Brigade's report also definitely indicates that the ceiling of the chamber inside the tank of the large new holder cracked owing to the steel structure by which it was supported giving way. The ceiling is now also definitely said to have been of riveted sheet iron, whereas it was not clear from the early reports of the accident whether ferro-concrete had not been largely used in the ceiling and its framework. Now we know that it was a steel framework which failed; and assuming there was no culpable scamping of the work of construction, it is pretty clear that the strains on this framework must have been underestimated, or the margin of safety cut too low. It is eminently desirable, in view of the failure of this framework, that the details of its construction, if not even the working drawings, should be published for the guidance of engineers engaged in similar construction work. One failure teaches more than many successful structures.

We have not yet heard whether the Hamburg Corporation have decided to reconstruct the large gasholder in accordance with the original design—merely using a stronger steel framework for the ceiling of the tank-chamber—or whether the elevated tank will be abandoned altogether for gasholders at the Grasbrook works. It may be said without fear of contradiction that though the number of persons injured on the gas-works was large, the damage done to property in the vicinity was smaller than might have been expected from two such enormous conflagrations. We doubt whether the adjoining wharves and the shipping will again be allowed to be exposed to the danger which is involved in the presence on this gas-works of a large holder sealed in an elevated annular tank. Almost the only gratifying feature of the disaster is that it has served to convince the people of Hamburg that the collapse of gasholders and the sudden combustion of their contents are not attended by any explosion. We have it on the authority of a naval engineer who was only some 150 yards from the large gasholder when the accident occurred, that there was nothing in the nature of an explosion or detonation—only the rushing or roaring noise of flames of immense volume.

The Fire Brigade's Report on the Catastrophe.

The Grasbrook Gas-Works are the oldest of the three large works owned by the City of Hamburg; and the storage plant consisted of two holders—one of 1¾ million, and the other (a new telescopic one) of about 7 million cubic feet capacity. The former was enclosed in a building covered by a wooden roof, and having large windows in the walls; the latter was in an unfinished condition. As the erection of this holder upon the ground level would have interfered too much with the transport of materials and other matters incidental to working, it had to be built upon a massive raised foundation, so that the bottom stood at a height of about 60 feet. It was formed of a saucer made of riveted sheet iron, covered by water to a depth of about 5½ inches. This saucer was carried on a steel structure resting on the concrete circular wall, and also upon a strong concrete pillar in the centre. On the day of the accident (Dec. 7), the filling of the holder was in progress. When it was about half full, the steelwork carrying the saucer gave way, cracking the saucer, and letting out the water it contained. The pressure of the holder forced the gas through the opening, and it was ignited at the half-open retorts close by. In the course of a few minutes, more than 3¼ million cubic feet of gas were consumed, and the flames set fire to several structures in the works. Altogether 72 persons were injured, 20 fatally.

On the arrival of the Fire Brigade with two steamers and five floats, a number of large fires had to be dealt with close to the new holder, and a few smaller ones as far distant as 300 feet. The scaffolding and portions of the wooden framework of a new coal-store in course of erection in ferro-concrete, a large wooden shed containing inflammable matter, and also the roof over the old gas-holder, only about 26 feet away, caught fire. The holder contained at the time nearly 1½ million cubic feet of gas ready for distribution. If it had been possible to extinguish the burning parts of the roof, the holder could have been saved from destruction; but the great size of the building—the wall being 206 feet in diameter and 75 high, and the roof rising to 116 feet—rendered it impossible to cope with the fire from the ground. On the other hand, to attack it from long mechanical fire escapes, or to attempt to scale the holder with hose-pipes from within the wall, seemed too dangerous for the firemen; for the heating of the bell by the fire raging in the neighbouring wooden shed, and the consequent expansion of the gas, would probably cause large quantities to escape at the bottom of the holder, and bring about the collapse of the building at any moment. Subsequently the roof fell in; and the crown of the holder was damaged by the falling steel girders to such an extent that the whole of the gas was burnt in from ten to, at the outside, fifteen seconds, with an enormous circular flame nearly 200 feet in diameter, producing a heat of about 200 million calories. Owing to the great precautions taken, it is gratifying to record that this second catastrophe did not lead to further injury or loss of life.

STATISTICS OF DUTCH GAS-WORKS.*

WE have received a copy of the compilation of statistics of the working results of gas-works of Holland for the year 1908, prepared by Heer P. Bolsius, the Manager of the Bois-le-Duc Gas-Works, and Heer M. van der Horst, of the Amsterdam Gas-Works. In the "JOURNAL" for Dec. 28 last (p. 876), we noticed the similar volume of statistics relating to the year 1907; and we will therefore now merely point out some of the changes which have been introduced in the present issue.

The particulars now given relate to 129 gas undertakings, in place of 121 in 1907. These include all the municipal gas-works of Holland and the majority of those owned privately. Some further particulars are given in the present issue under the heading of each town, in addition to those hitherto given—viz., the population of the town and of any suburbs which are supplied from the town gas-works; the largest and smallest numbers of retorts in action in the course of the year; additional details as to the disposal of the coke, and as to the strength of the liquor produced; and fuller information in regard to public lighting. The information afforded is most complete, as has been indicated in our reviews of the previous issues of this volume of statistics, the compilation of which must involve an immense amount of labour on the part of Heeren Bolsius and Van der Horst. The volume is, as before, issued privately, because the information collected is regarded as of a confidential character. Nevertheless, those interested in obtaining the fullest particulars in regard to the working results of a number of gas-works will probably find in it more complete details than are published in regard to the gas undertakings of any other country; and we believe that no difficulty would be experienced in obtaining copies of the volume by persons who wish to use the invaluable information it contains in a friendly manner.

* Statistiek Overzicht der Bedrijfsresultaten van de Gemeentegasfabrieken en eenige Particuliere Gasfabrieken in Nederland, in 1908, bewerkt door P. Bolsius, 's-Hertogenbosch en M. van der Horst, Amsterdam. Vertrouwelijke Mededeeling. C. N. Teulings, 's-Hertogenbosch; 1910.

The Census of Production.

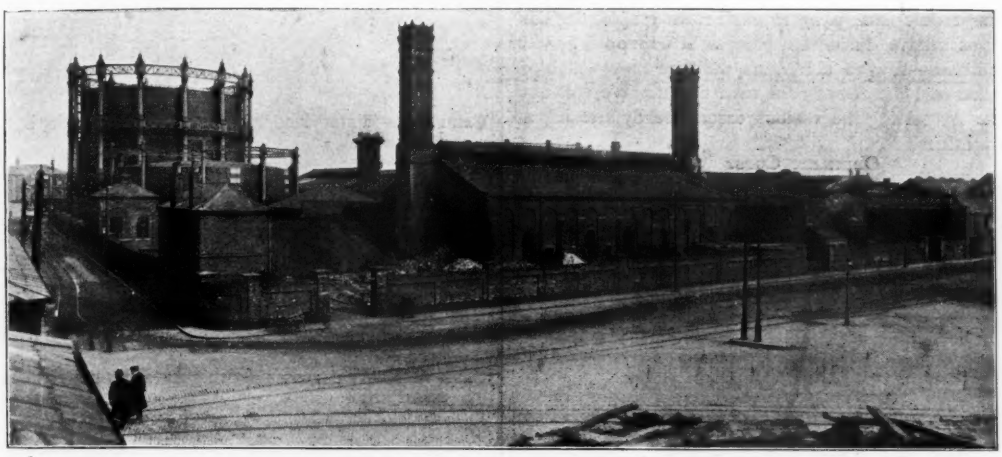
A Blue-book was issued on Friday containing the third of a series of tables summarizing for the more important trades of the country the preliminary results of the returns under the Census of Production Act, 1906, together with a report on the subject by the Director of the Census. Mr. G. R. Askwith, K.C., Comptroller-General of the Commercial and Statistical Department of the Board of Trade, states in a prefatory note that about 14,000 schedules were issued to firms engaged in 22 industries or groups of industries, which employed in 1907 an average of more than 650,000 persons, exclusive of outworkers, and produced a total output which represented a net addition of nearly £60,000,000 to the value of the materials used. A summarized statement of the results of the returns comprises figures in which the net output is arrived at by deducting from the gross output the cost of materials used and the amount paid to other firms for any work given out. Among the figures are the following: Chemicals, coal-tar products, &c.—net output, £9,464,000; persons employed, 51,088. Brick and fire-clay factories—net output, £5,060,000; persons employed, 63,287.

At the meeting of the Royal Society last Thursday, Professor Bertram Hopkinson, whose name is known in connection with gas-engine research, was elected a Fellow.

The annual general meeting of the Illuminating Engineering Society will be held at the Society of Arts rooms (John Street, Adelphi), on Monday, the 23rd inst., when a report of the session's progress will be presented by the Council. The chair will be taken by the President, Professor Sylvanus P. Thompson.

THE WORKS OF THE GREAT YARMOUTH GAS COMPANY.

With a Few Technical Experiences.



A General View of the Great Yarmouth Gas Company's Works.

DURING the meeting of the Eastern Counties Gas Managers' Association at Great Yarmouth, several of the members inspected the works of the Gas Company, and were made heartily welcome by their colleague, the Engineer (Mr. W. J. Carpenter), and his assistants. Mr. Carpenter, in the paper that he read before the Association a year ago, gave the members a considerable amount of information concerning the business and trading practices of the undertaking for whose technical and commercial operations he is so largely responsible; and it may now be of interest to supplement the information that was then given with the following notes on the works.

Situated at the South end of the town, adjacent to the Fish Wharf, the works occupy a site of 4 acres; and the buildings and plant (as was seen by the visitors) are substantially constructed and well-maintained. The design, arrangement, and general details are all in the style of the late Mr. R. P. Spice; and this was of interest to those younger engineers who have not been brought largely into contact with the work of this leader among gas engineers of a past generation. Following the incorporation of the Company in 1863, the works were inaugurated in 1869; the whole of the constructional work entailed in the building of the gasholders, retort-house, purifying-house, and necessary details being carried out by Messrs. Cutler and Sons, of Millwall, who have since been responsible for the whole of the extensions required from time to time. The confidence of the Board of Directors and of their Engineer has not been misplaced.

The coal used by the Company is derived from the Durham coal-field; "Londonderry" being used at the time of the visit of members of the Association. This coal is found to produce an excellent coke, which is a matter of great importance in connection with its local disposal. The steamers bringing the coal to the works are unloaded by a hydraulic crane, supplied by Messrs. Armstrong, Whitworth, and Co. It is interesting to note that the discharging-quay being also used for the unloading of salt and fish, no tipping of coal skips or tubs is allowed on account of the nuisance by dust that would be occasioned. For this reason, it was necessary to devise a special vehicle for conveying the coal to the works. There it is weighed and tipped into a hopper to be elevated, crushed, and delivered mechanically to a conveyor-belt running along the whole length of the coal-stores.

The retort-house, as now arranged, provides for a daily make of 1¼ million cubic feet of gas. The greatest output recorded does not exceed 750,000 cubic feet; so that, as seen, there is an appreciable reserve in the way of available producing plant to meet future needs. The system of heating the retorts is the regenerative principle; but no special type of setting is employed —that in use being to the designs of the Company's Engineer, and constructed by their own men. The charging and drawing of the retorts is effected by West's compressed-air machinery; but the form of scoop used is one patented by Mr. W. J. Carpenter with the object of securing a better and more even distribution of coal on the floor of the retort. The retorts are filled to their utmost capacity; and the charges are of eight hours' duration. From the books and working returns, it is seen that excellent results are obtained; the recently recorded make being, on the average, between 11,500 and 12,000 cubic feet per ton. No trouble, it was learned, is experienced with stopped ascension-pipes, as in the case of the six or five hour charges. The coke, too, is of excellent quality and of good size. A liquor seal is secured by the employment of tar-towers. The tar-mains under the hydraulic mains are all provided with a plunger, by which means the tar-pipes are cleared of any thick tarry accumulations requiring, from time to time, assistance on the way to the tar-towers.

Retort-house governors are in use; but Mr. Carpenter's experience is that no particular benefit is found by their adoption. On the contrary—in the cold weather more particularly—notwithstanding that the governors are kept hot, or in a warm room, the gas in passing through them is robbed of its thin tars and solvents, the naphthalene is carried forward, and a very objectionable deposit is found at the condensers, seals, and syphons—thus causing much anxiety in the working of this part of the plant.

Before leaving the retort-house, it is interesting to note that both the machine and sectionally made retorts used, have the bolt-holes so arranged that the hole for the oblong nut is to be found inside the retort, instead of outside the mouthpiece end as is usual. This method was adopted to facilitate the replacing of a burnt bolt when necessary; and the idea has turned out very economical.

Passing from the retort-house, the gas enters a condenser of the Morris and Cutler water-tube type; and thence to the exhauster house, where two exhausters (each of 60,000 cubic feet per hour) are provided. The exhauster-house contains the air-compressor required in furnishing power for the drawing and charging machines, as well as the hydraulic pumps in connection with the crane used for unloading the coal on the quay.

The boiler-house immediately adjacent to the exhauster-house contains two Lancashire boilers for providing the steam required in the pump-room contiguous thereto, and for all other purposes on the works. A third boiler is to be added to secure more effective conditions of working and cleansing.

At the outlet of the exhausters, the gas is dealt with by a Pelouze and Audouin tar-extractor, and then travels onwards through two tower scrubbers, fitted with boards, finishing with an oil-washer, for the extraction of naphthalene, before passing through a "Standard" washer.

On leaving the washer, the gas flows to the purifying-house, in which there are six purifiers. The first four are worked in a cycle, and lime is employed; the last two purifiers being charged with oxide and lime. Cutler's patent hydraulic valves are used throughout the system, and are spoken of as being excellent in all respects. From the outlet of the purifiers to the station meter, and thence to the controlling room (which also contains the safety and district governors), the gas passes to the gasholders.

Plant and systems for dealing with the naphthalene difficulty are found near the governor-room; and it is observed that paraffin is vaporized by a small carburettor, through which a proportion of the gas is passed on its way to the town mains.

Sulphate of ammonia is manufactured on the premises; while the tar is dealt with at the Company's tar and chemical works.

The Company's stables and horses and the various vehicles form quite a feature in the details of the work of the concern.

[Photographic views of interesting parts of the works appeared in the "JOURNAL" for April 27, 1909; and illustrations of the coal-handling plant were published on Oct. 8, 1901.]

The Gas-Turbine.—We have received from Messrs. Charles Griffin and Co., Limited, of Exeter Street, Strand, a work bearing this title, by Mr. H. Harrison Suplee, B.Sc. The author is a member of the American Society of Mechanical Engineers and of the Franklin Institute; and his work is a record of progress in the design and construction of turbines operated by gases of combustion, intended to place in the hands of engineers and experimenters such theoretical and practical data as are now available for the solution of the problem of the gas-turbine. It may be mentioned that the text, which is fully illustrated, occupies about 250 ordinary octavo pages; and that the price is 12s. 6d. net.

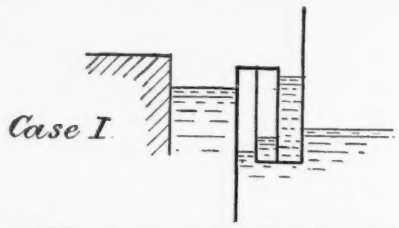
GASHOLDER CUPS.

By F. Southwell Cripps, Assoc.M.Inst.C.E.

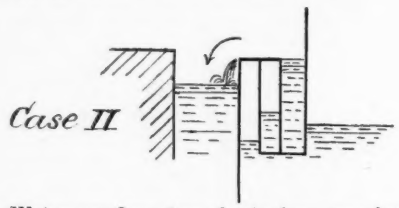
[Second Article.]

In a previous article (*ante*, p. 27) it was shown graphically how gasholder cups behave during the process of uncupping, under various conditions—how to determine whether they will blow when in action and the remedy for such defect. We will now give formulæ for solving the various cases already treated, as well as a few others.

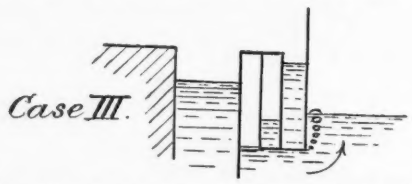
Ordinary Cups.



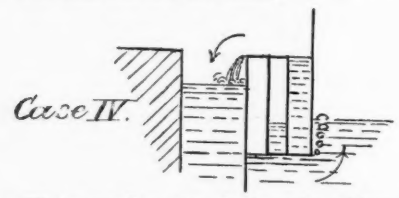
Case I.—In which water does not overflow the top of grip from cup, nor does gas blow under cup into holder, during process of uncupping. (See Case I. in first article.)



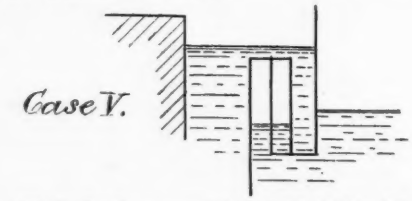
Case II.—Water overflows top of grip from cup, but gas does not blow under cup. (See Case II. in first article.)



Case III.—Water does not overflow grip, but gas blows under cup. (See Case III. in first article.)

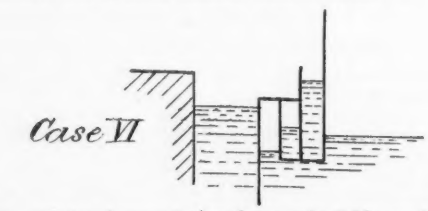


Case IV.—Water overflows top of grip and gas blows under cup. (This is a combination of II. and III.; very unusual, and therefore not given in first article.)



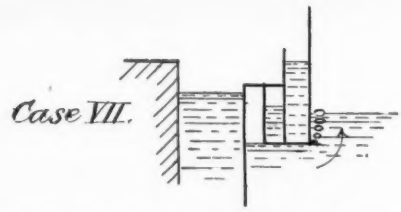
Case V.—Water floods cup over top of grip before landing outer lift weight, but not after.*

Shallow Cups, with Raised Grip Plates.

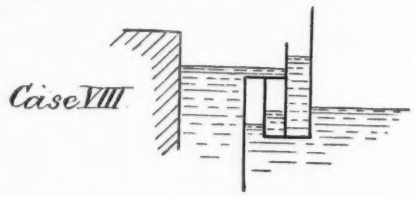


Case VI.—Water does not rise above grip table, and gas does not blow under cup. (See Case V. in first article.)

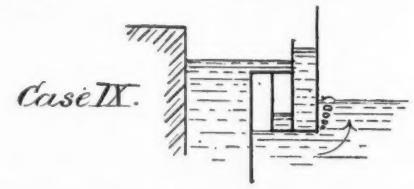
* Note.—If the grip is entirely under water after landing, the cup will not blow; so no formula is necessary. (See Case IV. in first article.)



Case VII.—Water does not rise above grip table, but gas blows under cup.



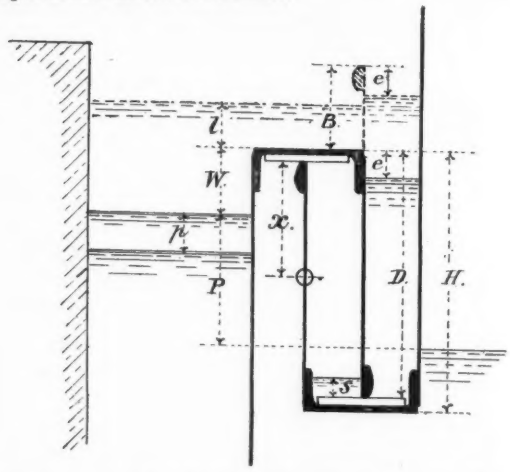
Case VIII.—Water rises above grip table, but gas does not blow under cup.



Case IX.—Water rises above grip table and gas blows under cup.

Note.—The cases of water overflowing grip plate need not be considered in this type of cup, as the grip plate would always be made high enough to prevent it.

A different formula is required for each of the above cases. Before we can proceed, then, it is necessary to find which formula is applicable, or, in other words, which Case does the example we wish to test come under.



In the accompanying diagram, and in the formulæ which follow,

Let P = Total pressure of all lifts up to and including one whose grip is treated.
„ H = Total depth over cup and dip when cupped.
„ e = Amount water level is reduced in cup by evaporation or otherwise, before lowering into tank—*i.e.*, distance from top of grip plate to water in cup.
„ S = Margin of safety allowed before blowing can occur.
„ D = Effective depth of cup.
„ W = Depth to water in tank below top of grip, at instant before landing lift whose grip is treated.
„ h = Pressure given by lift whose grip is being treated.
„ l = Height of water overflow above top of grip just before landing weight.
„ B = Projection of grip-plate (if any).
„ x = Distance below lip of cup where flooding holes are required to avoid blowing.
All dimensions and pressures are in inches.

Notes.—In designing a gasholder, many of these factors can be varied so that any desired result may be obtained—such as the depth of the cup D and H, the level of overflow W, and to some extent the pressures of the several lifts P and h.

There are, however, one or two factors which have to be fixed somewhat arbitrarily—viz., e and S.

e is the depth the water level stands in the cup below top of grip. In fixing this, we have to allow for irregularity in level of grip; reduction by evaporation (this varies according to the time the holder has been inflated)

less rainfall; and by the difference in pressure due to outer lift landing, in cases of inner lift cups.

If we allow ½ inch for irregular level, ½ inch for evaporation, and ½ inch to 1 inch for wind licking water out of cup and other causes, we have a total not exceeding 2 inches, which would suffice for the outer lift.

In the case of a multi-lift gasholder, half the pressure of the landed lifts has to be added to e, and the evaporation would be greater, as it is longer out of the water before it is replenished from the tank. In the case of an outer lift giving 3 inches pressure, e is increased by 1½ inches; but in that case, the 1 inch allowed above for wind effects, &c., need not be considered. We should therefore have e equal to 2½ inches, or supposing still another lift landed, it may be as much as 4½ inches, due to its half weight and extra evaporation, &c.

The rainfall is a great restorer of water levels, inasmuch as the rain falling on the entire crown of the holder can only run away *via* the cups. The inner lift cup is first filled. It then overflows into the next cup, and so on until it flows over the grip of the outer lift into the tank. We cannot, however, depend upon this in times of draught, and therefore it is wise to allow for e, as suggested above.

S is an allowance for the grip plate edge not being absolutely level, and may be taken at not more than ½ inch in a well-balanced holder. Some holders, however, are not so true; and a greater margin must be allowed to suit.

Ordinary Cups.

Then,

If e is greater than, or equal to, $\frac{1}{3}(H - W - P)$ and p is less than, or equal to . . $H - W - P$ } = Case I.

If e is less than . . . . . $\frac{1}{3}(H - W - P)$ and p is less than, or equal to . . $H - W - P$ } = Case II.

If e is greater than, or equal to, $\frac{1}{3}(H - W - P)$ and p is greater than . . . . . $H - W - P$ } = Case III.

If e is less than . . . . . $\frac{1}{3}(H - W - P)$ and p is greater than . . . . . $H - W - P$ } = Case IV.

If l is less than, or equal to . . p . . . = Case V.

Shallow Cups (with Raised Grip Plate).

If p is less than, or equal to . . $H - W - P$ = Case VI.

If p is greater than . . . . . $H - W - P$ = Case VII.

If p is less than, or equal to . . $H + l - P$ = Case VIII.

If p is greater than . . . . . $H + l - P$ = Case IX.

Note.—In "shallow cups" e should never be less than $\frac{1}{3}(H - W - P)$ or $\frac{1}{3}(H + l - P)$.

Formulæ for Ordinary Cups.

Case I. $$x = \frac{4P + H + 5e + 5S - 3D - W - p}{2}$$

Case II. $$x = \frac{7P + 3H + 7e + 10S - 6D - 3W - 2p}{4}$$

Case III. $$x = \frac{5P + 5H + 10e + 10S - 6D - 5W - 5p}{4}$$

Case IV. $$x = \frac{5P + 15H + 5e + 20S - 12D - 15W - 10p}{8}$$

Case V. $$x = \frac{7P + 3H + 7e + 10S + 2l - 6D - 2p}{4}$$

Formulæ for Shallow Cups (Raised Grip Plate).

Case VI. $$x = \frac{4P + H + 5e + 5S - 3D - W - p - 5B}{2}$$

Case VII. $$x = \frac{5P + 5H + 10e + 10S - 6D - 5W - 5p - 10B}{4}$$

Case VIII. $$x = \frac{4P + H + 5e + 5S + l - 3D - p - 5B}{2}$$

Case IX. $$x = \frac{5P + 5H + 10e + 10S + 5l - 6D - 5p - 10B}{4}$$

Formula VI. is the same as Case I., with the addition of $-5B$ to the numerator; B being the projection of grip plate.

Formula VII. corresponds with Case III., with the addition of $-10B$ to the numerator.

Formula VIII. agrees with Case VI., except that $+l$ is substituted for $-W$ in the numerator.

Formula IX. is the same as Case VII., except that $+5l$ is substituted for $-5W$ in the numerator.

It will be seen that in each case the formula determines x, the exact distance below lip of cup where flooding holes are required in cup plate to prevent it blowing.

If x is a *minus* quantity, the cup would not blow; and therefore no precautions against blowing are necessary.

It is desirable to put the flooding holes (say) 1 inch below the exact depth x, to be on the safe side.

The holes can be 1½ inches diameter, two in each bay round the holder, or 2 inch by 1 inch elongated holes.

Note.—All cups should be tested, not simply those on outer lifts.

The following examples should make the process clear.

Ordinary Cups.

Example 1.—Let P = 10″, H = 16″, e = 2″, S = 1″, D = 15″, W = 4″, p = 3″, l = 0,

then determine to which case it belongs; thus:

$$e = 3'' \text{ and } \frac{H - W - P}{3} = \frac{16 - 4 - 10}{3} = \frac{2}{3}$$

$p = 3''$ and $H - W - P = 2$.

Therefore e is greater than $\frac{H - W - P}{3}$ and p is greater than $H - W - P$.

Referring to the tests above, we see this accords with Case III. Hence, formula III. must be applied. We then have

$$x = \frac{5 \times 10 + 5 \times 16 + 10 \times 2 + 10 \times 1 - 6 \times 15 - 5 \times 4 - 5 \times 3}{4}$$

$$= \frac{50 + 80 + 20 + 10 - 90 - 20 - 15}{4} = \frac{160 - 125}{4} = \frac{35}{4} = 8\tfrac{3}{4}''.$$

That is, x, the distance of flooding holes from top of cup plate, must be 8¾″ at least, to avoid blowing when uncupping.

Example 2.—Now let P = 7″, H = 19″, e = 1½″, S = ½″, D = 18″, W = 6″, p = 1½″, l = 0,

$$\frac{H - W - P}{3} = \frac{19 - 6 - 7}{3} = \frac{6}{3} = 2, \text{ and } e = 1\tfrac{1}{2}''$$

$H - W - P = 6$, and p is 1½″.

Therefore e and p are both less than $\frac{H - W - P}{3}$ and H − W − P respectively.

Hence Case II. formula is required. Filling in values without repeating the formula, we have

$$x = \frac{7 \times 7 + 3 \times 19 + 7 \times 1\tfrac{1}{2} + 10 \times \tfrac{1}{2} - 6 \times 18 - 3 \times 6 - 2 \times 1\tfrac{1}{2}}{4}$$

$$= \frac{49 + 57 + 10\tfrac{1}{2} + 5 - 108 - 18 - 3}{4} = \frac{121\tfrac{1}{2} - 129}{4} = -\frac{7\tfrac{1}{2}}{4} = -1\tfrac{7}{8}''.$$

This being a *minus* quantity, the cup would not blow, and so no flooding holes would be required through cup plate.

Example 3.—Let P = 10″, H = 21″, e = 2½″, S = ½″, D = 20″, W = 5″, p = 3″, l = 0.

Then, as e is 2½ inches, it is greater than $\frac{H - W - P}{3}$ or 2.

And as p is 3 inches, it is less than H − W − P or 6.

Therefore by the above tests, Case I. formula is required. Applying this formula, we have

$$x = \frac{40 + 21 + 12\tfrac{1}{2} + 2\tfrac{1}{2} - 60 - 5 - 3}{2}$$

$$= \frac{76 - 68}{2} = \frac{8}{2} = 4''.$$

Hence, flooding holes would be required not less than 4 inches down from lip of cup.

Example 4.—Let P = 8″, H = 18″, e = ½″, S = ½″, D = 17″, W = 7½″, p = 3″, l = 0.

Applying tests, we find that

e being ½ inch, it is less than $\frac{H - W - P}{3}$ which is $\frac{5}{6}''$,

and p being 3 inches, is greater than H − W − P which is 2½″.

It therefore comes under Case IV.; and applying formula for same, we have

$$x = \frac{40 + 270 + 2\tfrac{1}{2} + 10 - 204 - 112\tfrac{1}{2} - 30}{8}$$

$$= \frac{322\tfrac{1}{2} - 346\tfrac{1}{2}}{8} = -\frac{24}{8} = -3''.$$

As x, in this instance, is a *minus* quantity, the cup will not blow.

Example 5.—Let P = 7″, H = 17″, e = 1″, S = ½″, D = 16″, W = 0, p = 3″, l = 2″.

From the fact that the water floods over the grip into the cup before it lands the outer lift, and that l is less than p, we know that it is a case for formula V. Applying which we get

$$x = \frac{49 + 51 + 7 + 5 + 4 - 96 - 6}{4}$$

$$= \frac{116 - 102}{4} = \frac{14}{4} = 3\tfrac{1}{2}''.$$

That is, flooding holes must be provided not less than 3½ inches from top of cup plate, to avoid blowing.

Shallow Cups.

Example 6.—Let P = 9″, H = 12″, e = 2″, S = ½″, D = 11″, W = 0, p = 2¼″, B = 6″.

Applying test we find

$p = 2\frac{1}{4}$ inches, which is less than H − W − P, or 12 − 0 − 9 = 3.

Hence we require formula for Case VI.

Filling in values, we have

$$x = \frac{36 + 12 + 10 + 2\tfrac{1}{2} - 33 - 0 - 2\tfrac{1}{4} - 30}{2} = \frac{60\tfrac{1}{2} - 65\tfrac{1}{4}}{2} = -2\tfrac{3}{8}''.$$

Therefore, as x is a *minus* quantity, the cup will not blow gas to waste, and no flooding holes are needed. This is the same example as No. 5, in the first article.

Example 7.—Let P = 9″, H = 12″, e = 2″, S = ½″, D = 11″, W = 2″, p = 3″, B = 6″.
Then p = 3 inches, is greater than H − W − P, or 12 − 2 − 9 = 1.
Therefore formula for Case VII. is required, applying which,

$$x = \frac{45 + 60 + 20 + 5 - 66 - 10 - 15 - 60}{4} = \frac{130 - 151}{4} = -5\tfrac{1}{4}''.$$

Hence, as x is a *minus* quantity, the cup will not blow.

Example 8.—Let P = 9″, H = 12″, e = 2″, S = ½″, D = 11″, l = 1″, p = 2¼″, B = 6″.
Then p = 2¼ inches, which is less than H + l − P, or 12 + 1 − 9 = 4″.
Formula for Case VIII. is therefore required.

$$x = \frac{36 + 12 + 10 + 2\tfrac{1}{2} + 1 - 33 - 2\tfrac{1}{4} - 30}{2} = \frac{61\tfrac{1}{2} - 65\tfrac{1}{4}}{2} = -1\tfrac{3}{8}''.$$

Therefore the cup will not blow.

Example 9.—Let P = 10″, H = 12″, e = 2″, S = ½″, D = 11″, l = 1″, p = 4″, B = 6″.
Then p = 4 inches, which is greater than H + l − P, or 12 + 1 − 10 = 3″.
Formula for Case IX. is therefore required.

$$x = \frac{50 + 60 + 20 + 5 + 5 - 66 - 20 - 60}{4} = \frac{140 - 146}{4} = -1\tfrac{1}{2}''.$$

So that the cup would not blow.

We have now had examples in all cases, including those solved graphically in the previous article. The formulæ give precisely the same results as are obtained by the more tedious process of following out the uncupping step by step.

There is no doubt that the arithmetrical method is less troublesome than the graphical for obtaining the results quickly; but it should be worked both ways as a check. The formulæ, as they stand alone, carry no conviction of accuracy with them. It may therefore be desirable to note their evolution from the graphical treatment previously given. It would be found to be an interesting study in the construction of formulæ, and may therefore form the subject of another article.

THE MODERN "PALATINE" COOKER.

Conveniences and Maintenance Facilities.

In a gas cooking-stove the householder looks for the maximum of convenience and efficiency, and the gas supplier who lets the stove out on hire has regard for, in addition to the features that will please the user, the facilities afforded by the manufacturer for maintenance and transport. With the ever-increasing cooker connections, the question of the maintenance of such goods becomes for any undertaking of greater and greater importance. It is a matter that has a not insignificant bearing on the economics of the distribution department. The gas consumer and the gas supplier have their requirements well satisfied in the latest development in ranges of the well-known firm of Fletcher, Russell, and Co., Limited. This "latest development" is embodied in the series of "Palatine" cookers, which, in their approach to perfection as household conveniences, and as meeting the requirements of gas undertakings, are both attractive and pleasing.

Those who have to export cookers will find the stoves appeal to them with considerable insistence, as being the *ne plus ultra* in simplicity of construction and efficiency. This simplicity of construction finds demonstration in the ease with which the whole of the details are taken apart for packing, and with as great readiness restored to a usable condition. In this, there is economy in time; and through the simplicity of the work of assembling the parts, the skilled man is not a necessity. In regard to the expense of maintenance, the facilities that the design gives for the lessening of labour, for the replacement of parts *in situ*, and for the saving of time (to say nothing of the reduction of inconvenience to the consumer to a minimum), must effect considerable economy. But all these points will be immediately apparent upon inspection by any gas manager.

Running generally over the components of the stove (all in the series are on corresponding lines), and specially marking some of the features, it is noticed that the oven is fitted with steel, swinging, hinged-gate, shelf-runners. The advantage, too, of the powerful grill is obvious; this having a patented arrangement by which each deflector-plate can be worked independently. It is also learned that, though the doors of the stock patterns are fitted with hinges on the left-hand side, and flue-outlets on the right, if preferred there can be a complete reversal of this order of things—the hinges being placed on the right-hand side, and the flue-outlets on the left. Then it is observed that all the burners—hot-plate and oven alike—are removable, and are fitted with gas and air adjusters, so that there can be regulation to secure the greatest temperature efficiency. The burners are scientifically proportioned, and made with the accuracy one is accustomed to expect from the firm. The usual fittings, consisting of two grid shelves, one solid shelf, a cake-plate, a meat-hook, a toaster, a grill-tin, and grid, are supplied with each cooker.

The "Palatine" cooker pleases not only in respect of its range of conveniences, and maintenance facilities, but in its appearance. It has a body of green porcelain enamel, effectively setting off the dead-black of the cast-iron parts, which are further relieved by the ground and polished mould round the front and two sides of the hot-plate frame, the outer top of the oven, the hinge bands latch, and all door mouldings.

THE PARKINSON "HOLBORN" CIRCULATOR.

In addition to their "Hydrotherm," of which an illustrated description appeared in last week's "Journal," there is another circulator that has been introduced by the Parkinson Stove Company, Limited, to notice in our pages. In calling attention to this appliance, it is unnecessary to refer again to the importance to the gas man of apparatus of this character; for the "hot-water" problem is one that is fully recognized and actively dealt with by progressive undertakings.

The "Holborn" Circulator.

The "Holborn" circulator should find a large sphere of usefulness; being compact and substantial, and attachable to the existing circulating pipes—thus providing the same service of hot water through the house as would be secured by the undesirable alternative (in the warm weather) of lighting the kitchen fire. As to the construction of the apparatus, interior chambers and connecting tubes are entirely dispensed with. The few joints are riveted or seamed, and not dependent on solder, so that leakage is practically impossible; while the water-chamber being vertical, without any cross tubes, and giving wide water-space, is not likely to be affected by lime deposit. For "hard-water" districts, too, the apparatus can, at a slight extra cost, be made to take to pieces by the unscrewing of four bolts, in which condition every part of the interior can be readily cleaned. Two burners are provided, with separate taps, giving a total consumption of 40 cubic feet per hour; but, as soon as the water is hot, the large burner may be turned off, and the small one, consuming 6 to 8 cubic feet per hour, is usually sufficient to maintain the heat and enable enough hot water to be obtained for the ordinary daily requirements and a hot bath at night. If the circulator should be reserved for providing large quantities of hot water only, a bath may be had in about 45 minutes from lighting the gas, at a cost of something like a penny. As to the working of the apparatus, it may be pointed out that the heated gases pass up into the interior, and then descend to the vent outlet, which is at the bottom. This arrangement, it is claimed, effects a saving of 20 to 40 per cent. in gas consumption as compared with the usual method of allowing the waste heat to escape at the top. The cost of fixing is small; for it is said that there is no smell from the gas, even when first lighted, and so no flue is necessary. Also, the installation of the apparatus does not interfere with the use of the coal-heated boiler; it being possible to employ the two alternately or concurrently.

ASSOCIATION OF DUTCH GAS ENGINEERS.

Annual General Meeting Arrangements.

The Thirty-Eighth Annual General Meeting of the Association will be held on Wednesday and Thursday, the 6th and 7th of July, in the Congress Chamber of the Palais des Fêtes at Brussels, under the presidency of Heer J. van Rossum du Chattel, the Manager of the Amsterdam Gas-Works. The programme for the meeting, in addition to the private business, includes the reception and discussion of the reports of the Committees of the Association on Photometry, on Coals, on Gas Oils, and on the Archives and Library of the Association, and the voting of the necessary sums for the continuation of the work of these Committees.

Communications will be made to the meeting as follows: (1) "Storage and Regulation of Pressure of Gas in Gasholders without Water Seal," by J. Bauduin; (2) "Euphos Glass," by J. D. J. Bresser; (3) "The Representation of the Association of Dutch Gas Engineers at the Exhibition of Municipal Operations at Scheveningen," by N. W. van Doesburgh; (4) "Separation of Tar from Carburetted Water Gas," by P. H. Hendriks; (5) "Dangers Connected with the Use of Volatile Combustible Liquids," by Dr. A. Steger; and (6) "Automatic Ignition and Extinction of Street-Lamps," by Dr. L. J. Terneden. In addition to the foregoing, a number of technical points are suggested for general discussion. The meeting will open with a reception on the evening of Tuesday, July 5, and the afternoon of the following day will be devoted to a visit to the Brussels Exhibition, and the afternoon of July 7 to an Inspection of the Forest Gas-Works at Brussels, of which Mr. H. H. Salomons is the Engineer. On Friday, July 8, those attending the meeting will, at the invitation of the Imperial Continental Gas Association, pay a visit to the new gas-works at Hoboken (Antwerp) of which Mr. W. J. Brender à Brandis is Engineer.

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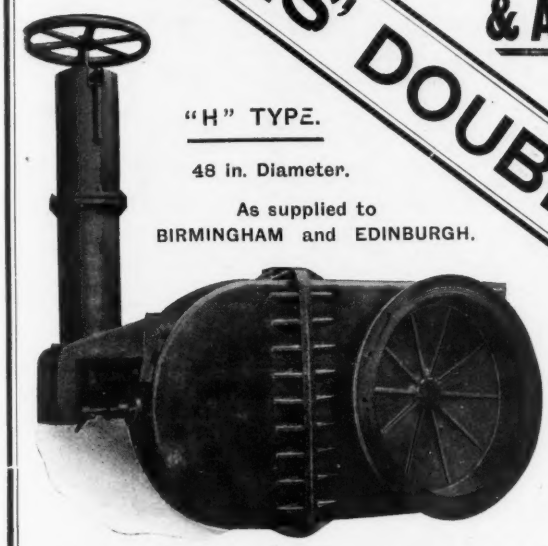

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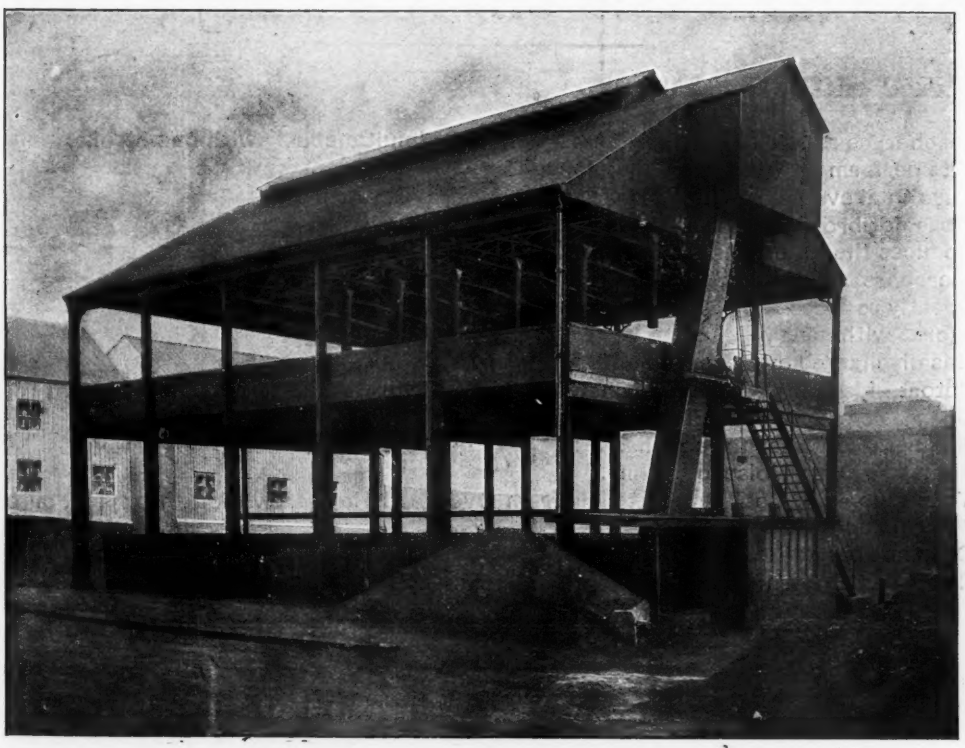

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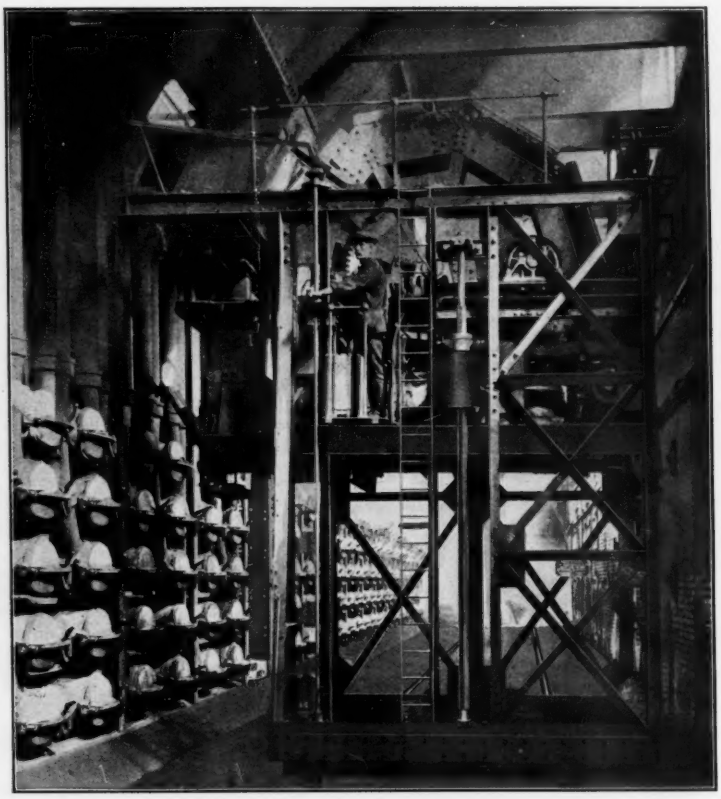

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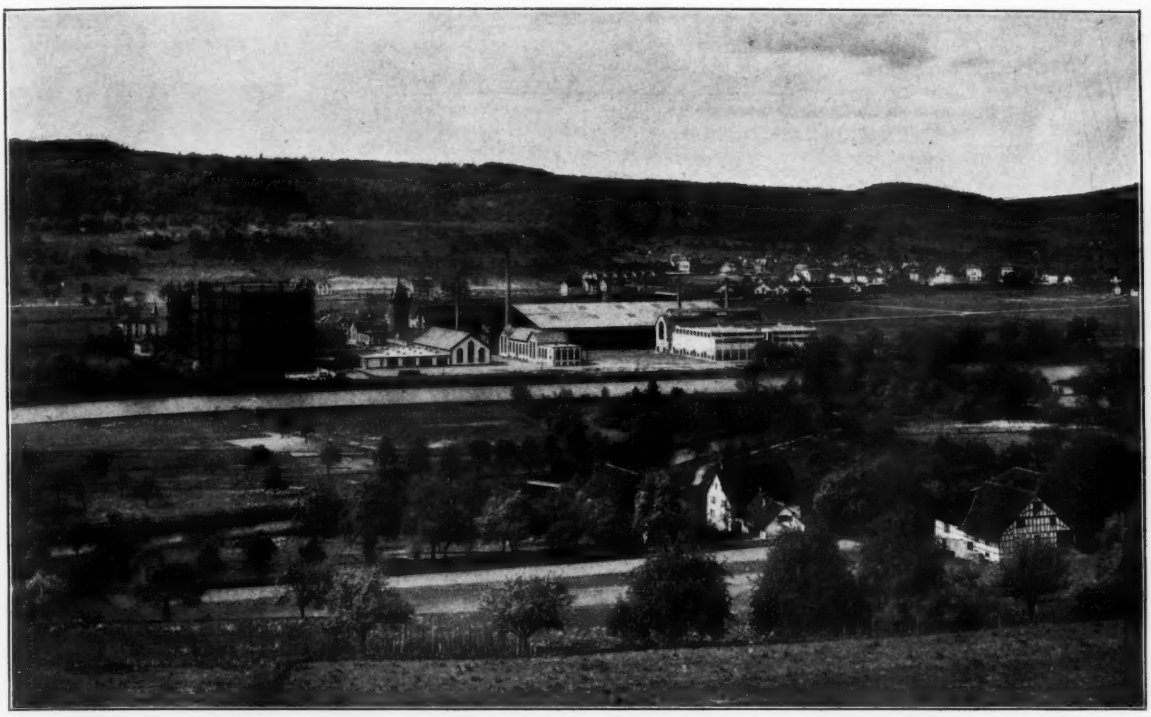
THE EXTENSION OF THE ZÜRICH GAS-WORKS.



A View of the Gas-Works and the Surrounding Country.

A DESCRIPTION of the Schlieren Gas-Works of the Corporation of Zürich was given in the "JOURNAL" in 1901, and shortly afterwards reprinted as a *brochure*, of which a few copies are still on hand at the office of the "JOURNAL." This description referred to the works as constructed in 1897 and 1898, and brought into use in November, 1898. It was believed when the construction was put in hand that new plant for a make of at least 25,000 cubic metres (882,500 cubic feet) per diem would be required by the autumn of 1897, and that the new works would have to be extended at successive intervals of ten years until a daily production of 100,000 cubic metres (about 3½ million cubic feet) had been attained.

As a fact, the increase in the demand for gas in Zürich has far exceeded the anticipations of that date; and by 1904, or six years after the new works had been constructed, the foreshadowed maximum, which is equivalent to an annual make of 20 million cubic metres (about 706 million cubic feet), had already been reached. For the year 1909, the make of gas exceeded 30 million cubic metres (1060 million cubic feet). It will thus be seen that the extensions which have been required have exceeded, both in regard to their extent and frequency, the anticipations of the programme which was laid down in 1896. The rapidity of the growth of gas consumption is clear from the annexed diagram (fig. 1), showing the consumption for the different years from 1898 to 1908 inclusive and the growth of population of the town in the same period. The population in the last ten years has shown an annual increase of 3·5 per cent.; while in the same time the consumption of gas for lighting purposes has increased on the average by 2·8 per cent. per annum, and that for cooking and heating purposes by 36·27 per cent. per annum. The consumption of gas for motors has fallen off, owing to the convenience of electromotors and their relative cheapness in Swiss conditions. The annual consumption of gas per head of the population, exclusive of public lighting and the suburbs, amounted in 1897 to 1688 cubic feet, and in 1908 to 4686 cubic feet. Thus in twelve years the consumption per head has risen by 178 per cent. These figures are an eloquent testimony to the general spread of the use of gas, not merely for lighting and industrial purposes, but in the household, both of the well-to-do citizen and of the workman. There are in the town of Zürich about 11,000 houses, comprising 39,000 tenements, and of these about 9000, comprising 30,000 tenements, are already provided with gas.

The Corporation of Zürich, at the end of 1904, decided, in order to cope with the rapid increase in gas consumption, to extend the gas-works to a daily productive capacity of 120,000 cubic metres (4,238,000 cubic feet). The programme of extensions comprised: (1) A coal-storage house of 7000 to 8000 tons capacity, with coal-handling machinery; (2) coal-conveying plant in the coal-store and to the retort-house; (3) a retort-house with plant for a make of 50,000 cubic metres (1,766,000 cubic feet) per diem; (4) coke-conveying and sorting plant; (5) water-gas plant of 15,000 to 20,000 cubic metres (530,000 to 706,000 cubic feet) productive capacity per diem; (6) an apparatus house and a purifier-house for a make of 120,000 cubic metres (4,238,000 cubic feet) provided provisionally with plant for a make of 60,000 cubic metres (2,119,000 cubic feet) per diem; (7) new wells or tanks for tar, liquor, and anthracene oil, with the necessary pumps; (8) a gasholder of 50,000 cubic metres (1,766,000 cubic feet) capacity;

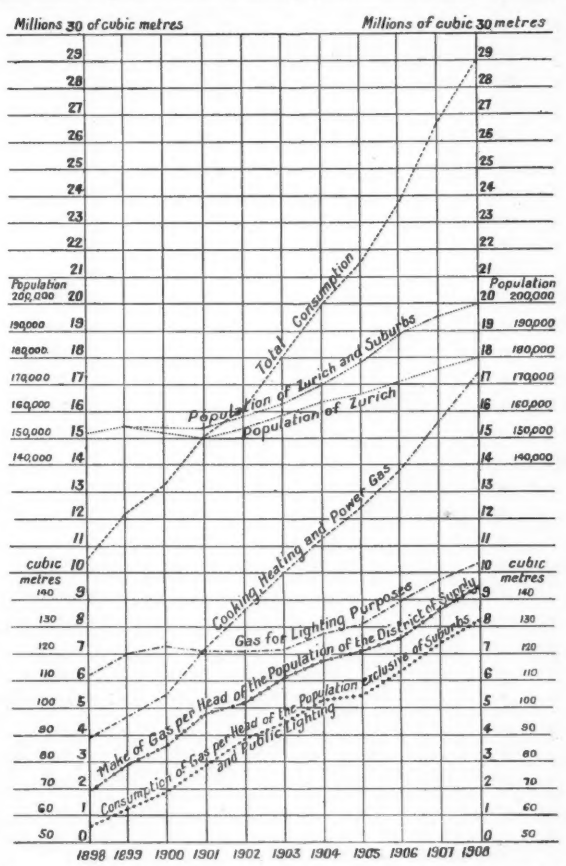
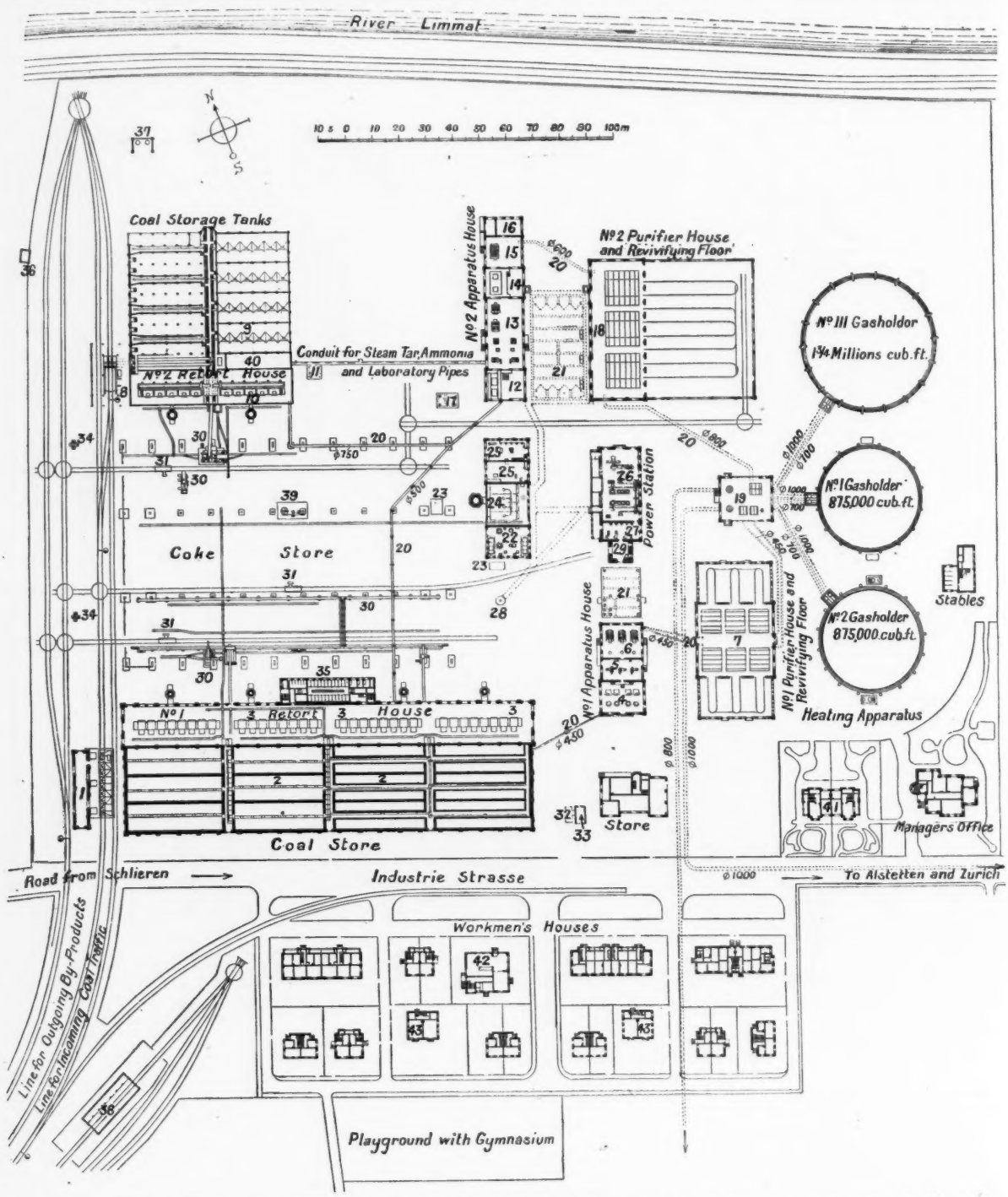

Millions of cubic metres
Millions of cubic metres
Population
Population
cubic metres
cubic metres
Total Consumption
Population of Zurich and Suburbs
Population of Zurich
Cooking, Heating and Power Gas
Gas for Lighting Purposes
Make of Gas per Head of the Population exclusive of Suburbs
Consumption of Gas per Head of the Population exclusive of Suburbs and Public Lighting
1898 1899 1900 1901 1902 1903 1904 1905 1906 1907 1908

Fig. 1.—Diagram showing the Annual Consumption of Gas in Zurich for the Years 1898-1908.

[1 cubic metre = 35·316 cubic feet.]



REFERENCES—1. Coal Hoppers and Elevators. 2. No. 1 Coal-Store (14,000 metric tons capacity). 3. No. 1 Retort-House, with 32 Settings of Inclined Retorts. 4. Atmospheric and Water Condensers. 5. Exhausters. 6. Tar and Liquor Washers. 7. No. 1 Purifying Plant. 8. Railway Waggon Tips. 9. No. II. Coal-Store (13,000 metric tons capacity). 10. No. II. Retort-House, with 10 Beds of Vertical Retorts. 11. Hydraulic Main Tar Well. 12. Water-Cooled Condenser. 13. Exhausters, Tar, Naphthalene, and Cyanogen Washers. 14. Secondary Condensers. 15. Liquor Washers. 16. Laboratory. 17. Anthracene Oil Well. 18. Purifying Plant. 19. Station Meters and District Governors. 20. Works' Gas-Mains. 21. Tar and Liquor Wells. 22. Liquor Distillation Plant. 23. Lime Pits. 24. Boiler-House. 25. Shops. 26. Power Station. 27. Pumps for Works' Water, Tar, and Liquor. 28. Pump Well. 29. Water Tower. 30. Coke Breaking and Handling Plant. 31. Weighbridges for Railway Waggons. 32. Weighbridge for Carts. 33. Porter's Lodge. 34. Switches. 35. Workmen's Rooms. 36. Sewage Pump Station. 37. Tar and Pitch Distilling Plant. 38. Locomotive Shed. 39. Fire-Clay Mill. 40. Experimental Gas-Works. 41. Officers' Houses. 42. Recreation and Reading Room. 43. Lavatories and Baths.

Fig. 2.—GENERAL PLAN OF THE GAS-WORKS AT SCHLIEREN, WITH THE EXTENSIONS.

(9) the necessary gas and water mains and electricity conductors and pumping stations; (10) roadways and railways; (11) experimental gas-works, with laboratory; (12) stores.

Further, a certain amount of additions were necessary in order that the output of gas might be carried on without a hitch during the period of the erection of the new buildings and plant on the works. Thus a fourth boiler, a steam dynamo of 250 H.P., new grids on the Jäger and "Bamag" systems for the existing purifiers, a station meter of 210,000 cubic feet capacity per 24 hours, and new liquor plant were required. Also, as the four benches of inclined retort settings in the first retort-house were of greater productive capacity than was contemplated in the original design, the apparatus for washing and purifying the gas from them was inadequate; and it was therefore imperative to start on the erection of the new apparatus and purifying plant, and the construction of the new tar and ammonia wells at the earliest possible moment. An account of the extensions has been given by Herr A. Weiss, the Engineer and Manager of the Zürich gas undertaking, in recent numbers of the "Schweizerische Bauzeitung," from which paper the particulars given here are taken, and the accompanying illustrations reproduced.

General Plan of the Extensions.

The above plan (fig. 2) of the gas-works shows the additions which have been made to the original plant of the 1896 scheme. The new coal-store adjoining the new retort-house has approximately the same capacity as the old coal-store, though it covers a much smaller area. It has been found quite possible, from the

experience gained with the first coal-store, to store coal to a greater depth; and the adoption of reinforced concrete for the construction of the new building has also reduced the space occupied by the building itself. The new retort-house also is of smaller dimensions than the former one, yet it has 30 per cent. greater productive capacity. The position chosen for the new coal-store and retort-house is such that they can be extended when necessary in two directions—viz., on the north towards the river, and on the east towards the town. The new exhauster and washer house is located near the boiler-house and power station, while to the east lie the new purifier-house and revivifying floor, which, of course, covers a considerable area. When necessary, the purifier-house can be extended towards the river. The tar and liquor wells are between the scrubber-house and the purifier-house. The new gasholder of 1¾ million cubic feet capacity is to the east of the revivifying floor, and in a line with the two older gasholders. The descriptive references appended to the plan will suffice to show the disposition of the rest of the buildings and plant.

New Coal-Store.

The new coal-store is separated from the retort-house by a passage only 18 feet wide; so that the distance over which the coal has to be conveyed from the store to the retort-house is as small as possible. It was originally intended to construct the coal-store in ordinary concrete; but it was decided to invite tenders also for reinforced concrete construction, and ultimately it was agreed to adopt the latter, both on the score of lower cost and of the smaller space required. The coal-store resembles the grain silos which are in use at the wharves in Hamburg and elsewhere. The capacity is from 12,000 to 13,000 tons. The store comprises eight equal sections, four on each side of a central passage, 18 ft. 6 in. wide, in which the conveying plant is placed. The superstructure of the store rests on 102 principal columns, which support the outer division walls. There are 80 intermediate columns, which support the horizontal and inclined girders of the floors of the silos.

The length of each section of the store is 87 feet, and the width 36 feet. The floors of the silos are at an angle of 41°, which is a greater inclination than the floors in the first coal-store, in which it was found that coals stored in a wet state on a floor inclined at 20° were not discharged automatically. The greater inclination given to the floors of the new coal-store has since been found to be entirely satisfactory. Beneath the different sections of the coal-store there are large spaces, well lighted and readily accessible, which serve as store-rooms and workshops. A general view of the coal-store showing the spaces beneath the inclined floors is given in fig. 3. The height of the underlying spaces is 7 feet at the sides and 16 ft. 6 in. in the middle, and the length of each is 85 feet. It will thus be seen that the area occupied by the coal-store is utilized both for that purpose and for general storage and workshop space. The method of construction followed is obviously advantageous wherever land is costly. The store is lighted by means of iron-framed windows, many of which open to afford ventilation. A concrete staircase is built out on the north side of the store; and there are iron staircases within the building. The roof of the store is of reinforced concrete, with roofing felt and fibre. The whole of the reinforced concrete

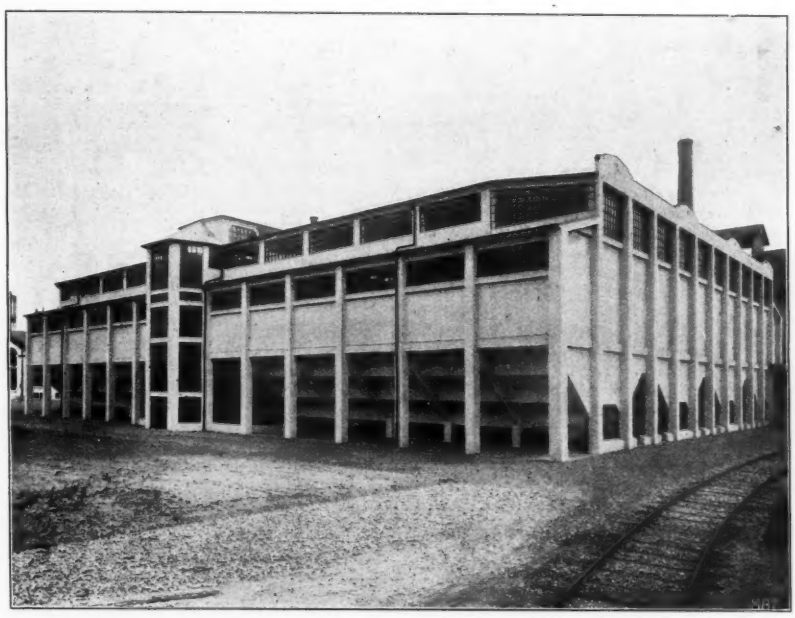


Fig. 3.—No. II. Coal-Store of Reinforced Concrete—North Side—of 13,000 Metric Tons Capacity.

surfaces have been left rough, and only limewashed where desirable for the sake of appearance.

Carrying and Storing of the Coal.

The coal arrives by the pre-existing railway lines, and so reaches the line adjoining the coke-store. If the train consists of ten or fewer waggons, it is run direct on to the line between the waggon tip and the turn-table; but if there are more than ten waggons, the train is broken up into two portions, one of which waits alongside the coke-store until the waggons in the first portion have been discharged. The waggons are brought in turn by rope traction on to the platform of the waggon tip, where they are discharged and run out on to a second line. The empty waggons are re-assembled and taken on to the sidings adjoining the gas-works either by means of locomotives or rope traction. The coal conveying arrangements for the first section of the works had the disadvantage that no provision was made for taking coal direct from the railway waggons to the retort-house without passing through the coal-store. Since it is well known that there is an advantage in carbonizing the coal as soon as it is received from the pits, the new conveying plant has been designed to provide for the coal being taken either direct into the retort-house or into the coal-store and thence to the retort-house. The coal-waggons are discharged by an electrically worked tip, loading up to 30 tons, which tips them to an angle of about 40°, so that the contents run out into an underlying funnel-shaped receiver.

The motor and gear for turning and raising the waggons are placed on a platform about 30 feet above the waggon-tip. The whole is carried by a strong girder framing, and automatic band brakes are provided on the machinery by which the waggons are tipped. The capacity of the tip is about 60 tons per hour; and the power required is from 15 to 20 H.P., according as the waggons dealt with are of 10 or 15 tons capacity. The total weight of the installation is about 37 tons. Only waggons which open at the ends can be handled with it. Two men are required to operate the tip. The coal is conveyed from the funnel-shaped receiver by two inclined band conveyors to the coal-breakers, or, in the case of small coal, direct to a Bradley bucket elevator and conveyor, which takes it either to the coal-store or to the retort-house. The coal in the store is removed by shuttle conveyors to the bucket elevators, and so conveyed to the retort-house.

Some details of the conveying arrangements may be mentioned. The coal from the receiver under the waggon-tip is discharged through an opening provided with a self-regulating counterpoised slide. The extent to which the slide is opened is automatically regulated according as the coal is large or small. The coal is fed uniformly into the band conveyors. But for the high level of the underground water on the site of the works, the coal-breakers would have been placed alongside the receiver, so that the inclined band conveyors would carry only broken coal. Since this arrangement was impossible, however, the coal-breakers have been erected between the store and the retort-house, and the broken coal passes down a shoot to the elevators. The conveyor by which large coal is taken from the receiver to the breakers is of the band type, and set at an angle of 26°. The band conveyors are 30 inches wide, and have an effective length of 118 feet. They are shown in fig. 4. The capacity of the large coal conveying band is 30 tons per hour. It travels at the rate of 20 inches per second, and requires 5·6 H.P. to drive it. The coal-breaker can be set according to the size of the coal to be broken, and is operated by a separate electromotor requiring 15 to 20 H.P. Two coal-breakers were originally provided; but as the coal received

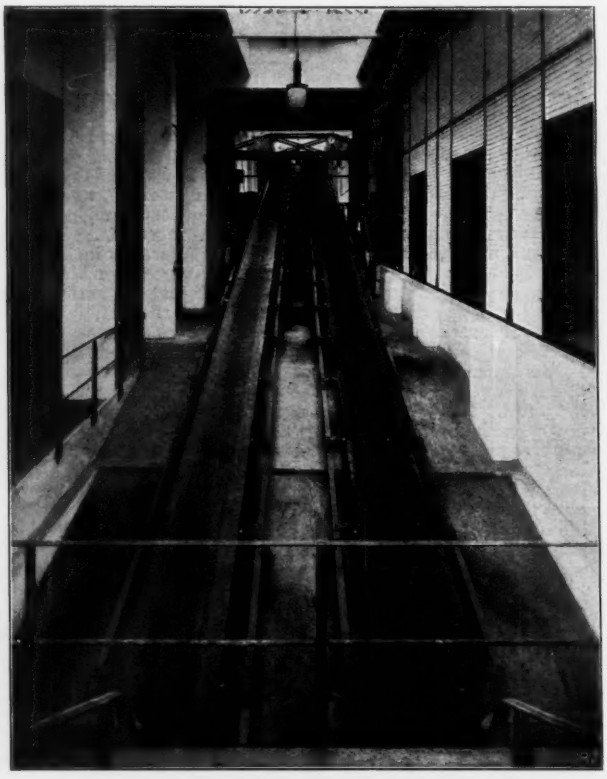


Fig. 4.—The Passage between the Coal-Store and the Retort-House for the Inclined Band Coal Conveyors—Showing at Back the Two Right-Angled Openings Discharging into the Coal-Breakers.

has to a large extent consisted of nuts, one breaker has hitherto sufficed. The broken coal can be diverted to either of two Bradley elevator-conveyors.

The Bradley apparatus is intended to serve three different purposes, and has a total length of 495 feet. It consists of 391 buckets with their rollers and bearings. The buckets and parts are connected by a four-ply rope of cast steel wire with annealed core, instead of by a chain. The length of the sections of wire varies from 16 ft. 6 in. to 26 feet. Very powerful chain driving gear is arranged where the bucket conveyor runs overhead. The chains and driving pinions are of cast steel. A band brake is provided on the chain gearing, which automatically throws the motor out of action if the Bradley apparatus is overloaded or broken. The whole bucket conveyor runs on steel rollers supported by a strong iron framing. At one of the lower angles of the train of the bucket conveyor a tensioning device with counterpoises has been provided, and thus the fluctuations in speed, which are inevitable owing to the great length of the conveyor, are easily met. The total weight of the two bucket conveyors, including the driving machinery and the supporting structure in the coal-store and retort-house, is about 90 tons. The capacity is about 30 tons of coal per hour, and the power required 6 to 7 H.P. Relatively to the large weight and the great length of the conveyor, the power required appears extremely small. This is due to the fact that the weights of the two vertical stretches of the conveyor are nearly balanced, and the friction on the horizontal stretches is not great. The conveyor makes a complete circuit in 9 minutes.

The different sections of the coal-store are filled by means of band conveyors running at right angles to the bucket conveyors. The bands are 18 inches wide, and have a working length of 102 feet. They are supplied by one or other of the bucket conveyors by means of an arrangement (which can be thrown in or out of action), by which the buckets are tipped and discharged on to the bands. The bands convey the coal to the small waggons which travel in either direction on a narrow gauge line over the sections of the coal-store, so that the coal may be tipped from them wherever desired. The bands travel at the rate of about 5 feet per second; and their capacity is 30 tons of coal per hour—the power required being about 2 H.P.

The coal is removed from the sections of the store for conveyance to the retort-house through funnel-shaped openings in the lowest part of the inclined bottom of the sections of the store. The openings are 15 feet apart, and are 10 in. by 14 in. in cross section. The coal falls on to the table of a distributor; and when the distributor is not in use, the openings are closed by the coal itself resting on this table. The distributors resemble those adopted in the earlier installation of 1898, though some improvements have been introduced. From the distributors, the coal is discharged on to shuttle conveyors such as were used in the No. 1 retort-house. The troughs, however, in which the new conveyors work, have been constructed on concrete base-plates instead of on wooden sleepers, as in the earlier installation. Six distributors supply each conveyor, and are put in and out of action by the starting and stopping of the conveyor. One of the conveyors—beneath the openings in the bottom of the coal-store—is shown in fig. 5.

The conveying troughs are about 98 feet long and consist of sheet steel one-fifth of an inch thick. They have a capacity of 15 tons per hour, and require 2·5 H.P. to drive them. The coal travels in them at a speed of 28 feet per minute. In order to avoid the deposition of dust in the chambers under the coal-tanks, the conveyor channels have glass covers. The coal is discharged from the shuttle conveyors into either of the bucket conveyors. As a rule, two shuttle conveyors are worked simultaneously, so as to utilize the bucket conveyor to its full capacity. It is thus possible to bring two different kinds of coal at the same time on to the bucket conveyor, which is often useful when, as is frequently the case, it is desired to carbonize a mixture of two different coals. The coal is delivered into the retort-house by the Bradley conveyor, the buckets of which are tipped and discharged at its highest point on to scraper conveyors, which traverse the coal-tanks into which the coal is discharged through ports closed by sliding doors. There are twenty such ports for each scraper conveyor. The scraper conveyors are 92 feet in length, and are driven by means of chain-gearing and an electromotor of 5 H.P. They can convey 30 tons of coal per hour, and travel at the rate of 20 inches per second. The top of the coal tanks in the retort-house, and the scraper conveyor by which the tanks are filled are shown in fig. 6.

The coal-store comprises four floors connected by staircases. On the ground floor are the two bucket conveyors and the eight shuttle conveyors; on the first floor is the 115 feet long band conveyor with sixteen drums; on the second floor the guiding and driving machinery for the eight band conveyors and the motors for the same. The third floor contains the return-way of the two bucket conveyors, with their driving machinery. The experience gained in the first part of the works led to preference being given to the same transmission being used for the power for the shuttle conveyors and the band conveyors. It had been found that when several conveyors of each type were provided, a continuity of work could be ensured, while the erection and working of the plant was considerably cheaper than they would have been if separate motors were used for each conveyor. The two Bradley conveyors only have separate direct driving power. There are two motors for the main power transmission, one of which is kept as a reserve. They are placed near the motors for the Bradley conveyors; so that they do not require any separate supervision. This small power station, containing four 15-H.P. motors, is situated in a well-lighted room, shut off from the storage space, constructed in reinforced concrete. Each motor has a separate ampère meter, so that the power used can be exactly ascertained. This arrangement makes for reliability in working and facility of supervision and control. It has worked very satisfactorily, and without any breakdown, during the two years which have elapsed since it was installed.

The coal-conveying arrangements described have a maximum

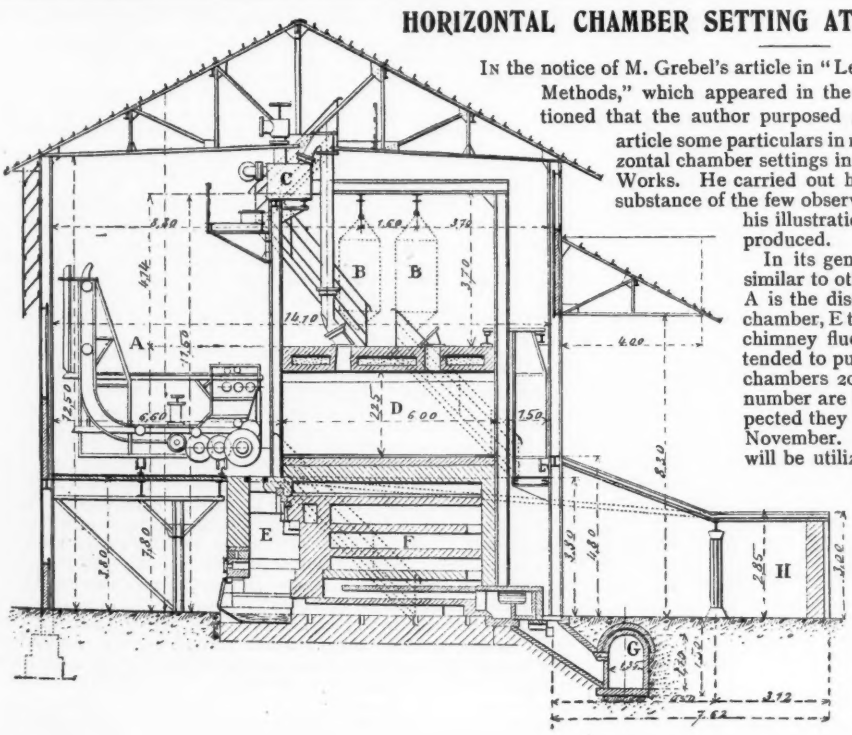
Fig. 5.—The Shuttle Conveying Trough, with the Distributors for Automatically Removing the Coal from the Storage-Tanks.

Fig. 6.—Coal Tanks and Scraper Conveyor above the Settings, with, in the Background, the Arc-Shaped Topmost Point of the Bradley Bucket Elevator Delivering into the Scraper Conveyor.

capacity of 60 tons per hour, which, with ten hours' work, means a daily capacity of 600 tons. Though the prime cost of the installation, especially of the two Bradley conveyors, is high, its working has proved both trustworthy and economical. The whole conveying plant from the railway waggon-tip to the coal-tanks over the retort-settings is looked after by one man (a mechanic), who is not fully occupied therewith. More than 100,000 tons of coal have been conveyed by the plant in two years; and no repairs whatsoever have been necessary. The wear and tear on the band conveyors, as well as on the bucket conveyors, has so far been practically *nil*. The wages, on the basis of 600 tons of coal being conveyed daily, amount, from the discharging place to the store or to the overhead tanks, to 0·34d. per ton, and from the store to the retort-house to 0·05d. per ton. These figures indicate the great economy of the working. A less complete, but perhaps somewhat simpler, conveying plant of the same capacity would have entailed considerably greater working charges. The conveying charges with the earlier installation on the works are about twenty times as great, though these show considerable economy as compared with the hand working previously prevailing. A great advantage of the new plant is its almost complete independence of the working staff, as only one man is required to look after it.

(*To be continued.*)

HORIZONTAL CHAMBER SETTING AT VERSAILLES GAS-WORKS.



In the notice of M. Grebel's article in "Le Génie Civil," on "New Carbonizing Methods," which appeared in the "Journal" last week, it was mentioned that the author purposed giving in the second portion of the article some particulars in regard to the first installation of horizontal chamber settings in France—that at the Versailles Gas-Works. He carried out his intention, and we give below the substance of the few observations that he makes to accompany his illustrations of the setting, one of which is reproduced.

In its general arrangement, the installation is similar to others of the kind. B are the chargers, A is the discharger, C the hydraulic main, D the chamber, E the generator, F the regenerator, G the chimney flue, and H the coke-hopper. It is intended to put up six settings, each containing four chambers 20 feet long; but only one-third of the number are being erected this year, and it is expected they will be ready for use by the end of November. The existing retort-house chimney will be utilized provisionally. The transport of the 2-ton coal-skips for the filling of the chambers will be effected by electric waggons. The coke that comes from the setting will be quenched in the open air, and will first of all be filled into hoppers under which will pass a line of trucks. An interesting feature of the installation is that the gas produced in it, instead of being immediately mixed with the ordinary make, can, if desired, be condensed, washed, and purified by independent plant, and stored separately.

NORTH OF ENGLAND GAS MANAGERS' ASSOCIATION.

Half-Yearly Meeting at Sunderland.

The Sixty-Sixth Half-Yearly Meeting of the North of England Gas Managers' Association was held on Saturday, in the Lecture Theatre of the Subscription Library in Fawcett Street, Sunderland—the PRESIDENT (Mr. T. H. Duxbury, of South Shields) in the chair. The meeting was exceedingly well attended.

THE DEATH OF KING EDWARD.

The PRESIDENT said they had met under most painful circumstances, owing to the death of their much respected King. It was a national calamity, and one which all sections of the people, irrespective of creed, politics, or vocation, were deeply mourning, throughout the world, because King Edward VII. stood pre-eminent as the most tactful and the most popular Monarch that ever sat on the Throne. If it had been possible to have cancelled the day's meeting, the Committee would have arranged for it to be done; but, as they knew, the members came from all over the Northern Counties, and there was no time to communicate with them. Therefore, though the position was a very difficult one, the Committee had decided that the meeting should proceed, but that the essential features only of the day's proceedings should be carried out. This would include the formal business of the meeting, the visit to the Ayres Quay Gas-Works, and a bare meal—the whole of the toast list at the dinner being eliminated. He hoped that this would meet with the approval of the meeting. It was the best the Committee could do under the circumstances. He had another painful reference to make—he alluded to the death of Alderman Allan, the Chairman of the Walker and Wallsend Gas Company, who was one of the original members of the Association, having joined in 1877. He thought they would wish that a letter of condolence should be sent to his family. He would like also to mention that a familiar face was absent that morning, in the person of Mr. Thomas Bower, of West Hartlepool, who, they knew, had been passing through a serious and critical illness. It would be fitting that a letter of sympathy with him should be sent from the Association, expressing their regret at his absence, and hoping for a speedy recovery for him.

Both proposals were agreed to.

CORRESPONDENCE.

The HON. SECRETARY (Mr. Herbert Lees, of Hexham) read letters from the families of the late Mr. J. H. Cox, of Sunderland, and Mr. M. Leaf, of York, in response to votes of condolence with them in their bereavement. He also read a letter from the Chairman of the Sunderland Gas Company, regretting his inability to be present, on account of his being from home.

ANNUAL ACCOUNTS.

The PRESIDENT said that copies of the accounts had been sent out to members of the Association; and he only needed to mention that there was a deficit on the year of £16, which was due to their donation to the Sir George Livesey Memorial Fund. The balance of £79 from the revenue account, *plus* £191 of investment, gave the total means of the Association at £270. So they might safely consider they were in a very satisfactory financial position. He formally moved the adoption of the accounts.

This was seconded by Mr. J. LEWIS (Newcastle), and agreed to.

NEW MEMBERS.

On the motion of Mr. W. FORD (Stockton), seconded by Mr. JAMES WHYTE (Seaham Harbour), the following gentlemen were admitted to the Association.

Members.—Mr. John Demain, Manager and Secretary of the Garforth Gas-Works, near Leeds; Mr. Edward Geo. Hutchinson, Engineer and Manager of the Workington Corporation Gas-Works; Mr. Ernest Dodd Wootten, Manager and Secretary of the Cockermouth Gas-Works; Mr. Frank Newcombe Oakley, Manager of the Berwick Gas-Works.

Associates.—Mr. Henry Towsley, Distribution Superintendent, South Shields Gas Company; Mr. T. N. Ritson, Consulting Engineer, Gateshead; Mr. Geo. Scott Coburn, Draughtsman, Gas Engineer's Office, Newcastle.

THE BENEVOLENT FUND OF THE GAS INSTITUTION.

The HON. SECRETARY read a circular letter from the President of the Institution of Gas Engineers, asking that a special effort be made to increase the contributions to the Benevolent Fund of the Institution. The letter, the Secretary said, had been before the Committee of the Association; and, as they would observe on the *agenda*, they recommended the meeting to vote a donation of five guineas to the fund. He might say that, in accordance with recent legislation, the Secretaries of all the District Associations were now *ex-officio* members of the Committee of Management of the fund; so that every District Association was in touch with the fund. He could assure them that the cases which had come before them during the past year were all necessitous, and that the money was being devoted to a very laudable object, and one which ought to command their interest and support. They had in their Association about 45 members of the Institution; and of this number 14 were subscribers directly to the Benevolent Fund. It would perhaps not be amiss here to suggest that others might become subscribers to the fund, and thus help to support it. Further than this, there were many who were not members of the Institution who might perhaps like to contribute something; and it had been suggested in committee that if the five guineas could be supplemented by donations from members or associates of the Association, such donations would be sent on in addition to the five guineas which it was proposed to pay from the funds of the Association. He proposed that the recommendation of the Committee be adopted.

Mr. C. H. ARMSTRONG (Wallsend) seconded, and the motion was cordially agreed to.

A SPECIAL PURPOSES SECTION.

The following proposals had been circulated among the members previous to the meeting.

REPORT ON THE FORMATION OF A SPECIAL PURPOSES SECTION.

Your Committee have given careful consideration to the suggestion made by the President in his address at the last meeting of the Association, with reference to the formation of a sub-organization somewhat on the lines of the Commercial Sections at work in other districts.

The title generally applied to these sub-organizations does not, in the opinion of your Committee, correspond to the work undertaken by them; and they would suggest that, in the event of such a section being formed by this Association, the title should be "Special Purposes Section."

The advantages of such sub-organizations are acknowledged by all who have had experience of them in other districts; and your Committee have no hesitation in recommending the formation of one for this district. They beg to submit the following code of rules for your consideration.

Special Purposes Section of the North of England Gas Managers' Association.

RULES.

1.—The objects of the section shall be to deal with such matters relating to the interests of the gas industry as shall from time to time be deemed desirable by the members of the section.

2.—Membership of the section shall be open to gas undertakings whose chief officers are members of the Association, on payment of an annual subscription of £1 1s. for undertakings having a make of gas not exceeding 200 million cubic feet per annum; of £1 11s. 6d. for undertakings having a make of gas above 200 million, and not exceeding 2000 million, cubic feet per annum; and of £2 2s. for undertakings having a make of gas exceeding 2000 million cubic feet per annum. Undertakings on the lowest scale to be entitled to one representative; on the intermediate scale, to two representatives; and on the highest scale, to three representatives. The representatives to be thus elected shall be restricted to the engineer, secretary, or manager for the lowest and intermediate scale undertakings; and for undertakings on the highest scale the distribution engineer shall also be eligible for election. In addition, to representatives so elected, the section may, on the recommendation of the committee of the section, co-opt persons who, by reason of their professional knowledge and experience, are qualified to assist in advancing the objects of the section. Such persons must be members of the Association. Provided, further, that such co-opted members shall not exceed three in number.

3.—The management of the section shall be entrusted to a committee of its members, consisting of a chairman, vice-chairman, secretary and treasurer, and three members to be elected annually by ballot.

4.—The section shall hold monthly meetings, and report annually to the committee of the Association.

5.—The committee of the section may invite the attendance of any person or persons who may be able to give useful information on the subject under discussion at any particular meeting.

6.—The Association shall be competent to discontinue and wind-up the section at the annual general meeting in any year, after notice given at the preceding autumn general meeting, if its continued existence should be found incompatible with the best interests of the Association.

7.—Notice of any proposition for amending these rules must be given at a general meeting of the Association; and such notice shall appear on the agenda issued to the members for the following general meeting.

On behalf of the Committee,

T. H. DUXBURY, *President.*

The PRESIDENT said he had pleasure in submitting the Committee's report on the formation of a Special Purposes Section, copies of which, along with draft rules, had been forwarded to the members. The Committee had obtained a mass of information from other sections in the country, relative to the working of those sections, and representatives had also attended meetings in the various districts; and they unanimously recommended that such a section be formed in connection with the North of England Association, which now, as a matter of fact, was the only district that had not such a section. An important point to remember was that the rules did not tie down the section as to the lines on which it should be run, but left it to formulate its own procedure. He proposed that the report of the Committee be adopted, and they be instructed to proceed with the formation of a section.

Mr. W. HARDIE (Tynemouth), in seconding, said he thought the Committee had done wisely in taking into consideration the formation of such a section. They had done a good thing in making the name somewhat different from what was usual—that was to put it as a Special Purposes Section, and not as a Commercial Section—because, while a commercial section was useful, there were other purposes which were equally important. He had noticed that at their ordinary meetings the most valuable part of the proceedings was that which took place after the meeting was over, or before it began, in having something of the nature of an informal discussion on subjects in which they were all interested. Such a section as was proposed would be very valuable.

The motion was adopted.

ELECTION OF OFFICE-BEARERS.

The PRESIDENT intimated that, to save time, the Committee appointed the Auditor, along with Mr. Armstrong, to act as Scrutineers in the election of office-bearers; and the result was as follows:

President.—Mr. J. Lewis, of Newcastle.
Vice-President.—Mr. H. Tobey, of Malton.
Auditor.—Mr. W. Garbutt, of Newcastle.
Hon. Secretary.—Mr. Herbert Lees, of Hexham.
Members of Committee.—Mr. Matt. Dunn, of Stockton; and Mr. T. Hardie, of Newcastle.

The PRESIDENT expressed pleasure at the election of Mr. Lewis, who was an old personal friend of his. They were, he said, both born in the same Lancashire town, and received their initial gas-works training in adjoining places. He was sure they would all be glad to see that Mr. Tobey had allowed his name to go forward for a second time as President.

PLACE OF NEXT MEETING.

Mr. LEWIS proposed that their next half-yearly meeting be held in Newcastle. He thanked them for having elected him as President, and said he was glad indeed to be able to inform them that the Directors of the Newcastle and Gateshead Gas Company would be pleased to see the Association in Newcastle. He proposed a vote of thanks to the Directors and the Engineer of the Sunderland Gas Company for their courtesy in allowing them to go down to their works at Ayres Quay, to inspect the installation of vertical retorts.

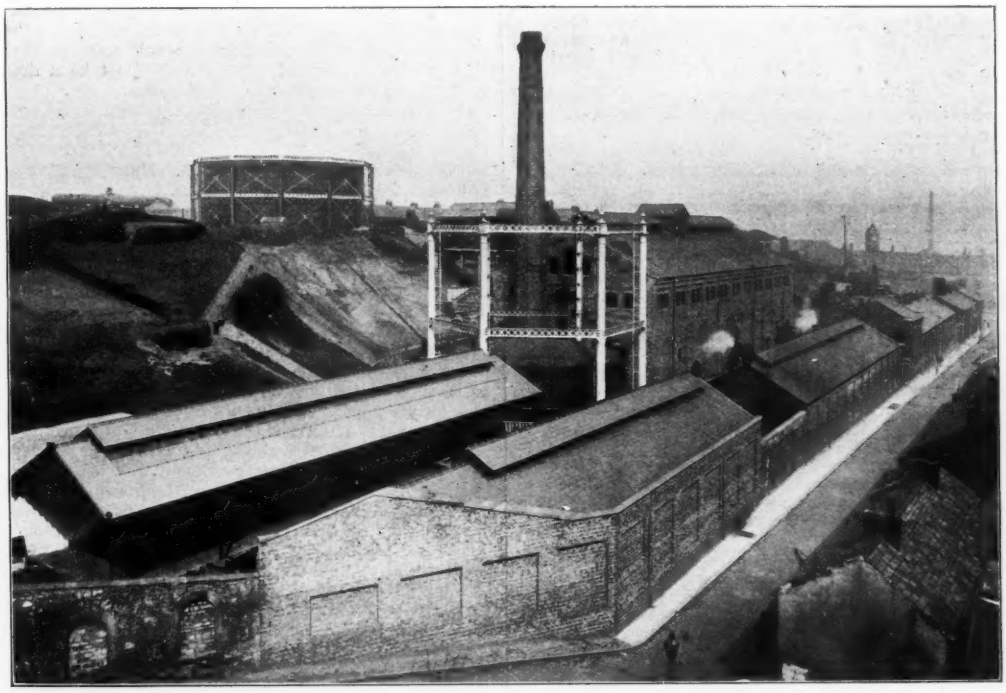
Mr. FORD seconded, and the vote was agreed to.

Mr. H. TOBEY proposed a vote of thanks to the President, the Hon. Secretary, and the Committee for their services during the past year.

Mr. T. HARDIE seconded, and the motion was cordially agreed to; the PRESIDENT returning thanks.

VISIT TO AYRES QUAY GAS-WORKS.

At the close of the meeting, the members drove to the Ayres Quay Gas-Works, recently reconstructed, and into which there has been introduced an installation of Dessau vertical retorts.



GENERAL VIEW OF THE AYRES QUAY GAS-WORKS, SUNDERLAND.

THE AYRES QUAY GAS-WORKS.

In connection with the visit of the members to the above-named works, some illustrated descriptive particulars had been prepared in pamphlet form by Mr. C. Dru Drury. Our readers may remember that a plan of the works was given in the "JOURNAL" for July 2 last year (p. 22); and the special feature of attraction on Saturday—the setting of Dessau vertical retorts—was illustrated in the number for the 23rd of November (p. 531).

Description of the Works.

The Ayres Quay works are the smaller of the two gas-works owned by the Sunderland Gas Company, and were first erected in 1847. The plant having become worn out, the old works were shut down two years ago; and, with the exception of one gas-holder, they have since been completely reconstructed. The Directors took the opportunity thus afforded them of introducing the Dessau vertical retort system for carbonizing purposes, and care was taken that the remainder of the plant should also be up-to-date. The works thus reconstructed were brought into use on the 4th of December, 1909.

The site of the works is irregular, both in shape and levels, and only about two-thirds of the total area of the ground is available for building purposes; the level of the railway sidings being fully 50 feet above that of the yard. The sidings are in communication with the North-Eastern Railway, and the coal-waggons deliver their contents direct into the ferro-concrete receiving bunker, from which the coal is discharged either through a bottom door into a breaker and elevated into the continuous hoppers over the bench, or through side doors into skips, travelled by hand, suspended from overhead runways in the coal-store, by which means the store is filled. The coal thus stored is unbroken, and when required can be drawn off and passed through an independent breaker feeding into the elevator which is common to both breakers. An emergency arrangement is provided for handling the coal in case either of the breakers or the elevator should at any time fail.

The coal-handling arrangements and those for elevating coke and breeze to the overhead hoppers are so designed that the whole of the work when the retort-house is fully equipped can be done by yard men in an ordinary day. The retorts are 4 metres (13 ft. 1½ in.) in length, capable of carbonizing 58 tons of coal per day on the basis of twelve-hour charges, and of producing about 750,000 cubic feet of gas. With the exception of the lower portion of the retorts, the brickwork in the combustion chambers, and a few special fittings, the whole of the bench consists of British materials and workmanship.

The purifiers have been left uncovered; the revivifying floors on each side alone being provided with roofs. The first four boxes are worked in rotation by means of a Weck valve; and the fifth box acts as a catch purifier, and is worked by three separate slide-valves.

Of the gasholders, No. 1 was previously a three-lift holder with the top lift rope-guided on Pease's principle. Last year, a new fourth lift, also rope-guided, was added, and the sides of the

bottom lift were resheeted; the addition of a row of intermediate girders with diagonal bracing being at the same time made to the framing. The tank is of masonry, backed with puddle, with a flat puddled bottom. No. 2 gasholder was erected in the year 1881 on the site of an older holder of the same diameter. The tank is of cast iron.

The tar and liquor produced are collected in underground storage-tanks, and then pumped up into overhead loading-tanks erected alongside the railway sidings; the contents of the latter tanks being filled into railway tank-waggons. The liquor is sent to the Company's Hendon works, and there converted into sulphate of ammonia; the tar being dispatched to distillers.

A feature of these works is that all valves of all sizes, whether gas, water, tar, liquor, or steam, close with the sun.

In the case of the retorts, condensing, and washing plant, the first only of two units has at present been provided. In other respects the plant is capable of dealing with a maximum make of 1½ million cubic feet of gas per day.

Particulars of the Buildings, Plant, &c.

COAL-RECEIVING BUNKER.—Ferro-concrete (Hennibique system) with corrugated steel house and direct communication on top with railway sidings. Capacity, 200 tons.

COAL-STORE.—Fitted with overhead runways and skips for filling and emptying. Capacity, 1600 tons.

RETORT-HOUSE.—181 ft. 6 in. long by 64 ft. wide inside and 41 ft. 8 in. high to the eaves. Chimney 130 feet high.

RETORTS (FIRST SECTION).—One bench of six beds of ten Dessau vertical retorts, each 13 ft. 1½ in. long, 9 in. by 22½ in. oval section at the top, tapering to 13½ in. by 27 in. at the bottom. Capacity of each retort, 9¾ cwt. of coal per charge. Overhead continuous coal-hoppers, capacity 100 tons, with additional hoppers for coke and breeze.

COAL-HANDLING PLANT.—Two coal-breakers, capacity of each 20 tons per hour, conveyor, elevator, and rotary screen, all electrically driven.

COKE-HANDLING PLANT.—De Brouwer hot-coke conveyor, rotary screen, and coke-hoist, all electrically driven. Also storage hoppers.

ELECTRICAL PLANT.—Two 40 Kw. dynamos, each driven direct by a 68 B.H.P. gas-engine; one 11 B.H.P. and three 20 B.H.P. motors, 220 voltage.

RETORT-HOUSE GOVERNOR.—Cowan type, 10 inches diameter.

CONDENSERS (FIRST SECTION).—One Morris and Cutler water-tube condenser. Capacity, a million cubic feet per day.

BOILERS.—Two Cornish boilers, each 5 ft. 6 in. diameter by 22 feet long, fitted with Wilton's breeze furnaces. Boiler pressure 80 lbs. per square inch.

EXHAUSTERS.—Two four-blade exhausters and steam-engines, each of 80,000 cubic feet per hour capacity.

WASHERS (FIRST SECTION).—One Livesey washer. Capacity, a million cubic feet per day. One Kirkham washer-scrubber. Capacity, a million cubic feet per day.

PURIFIERS.—Five boxes, each 25 ft. by 20 ft. by 5 ft. 8 in. deep inside, with dry-lute covers, 18-inch connections, Weck's centre-valve, and Hovey's patent cover crane, fitted with Spencer's hurdle grids. Covered revivifying floor on each side of the line of purifiers.

STATION-METER.—Capacity, 80,000 cubic feet per hour.

STATION GOVERNORS.—One 12-inch and one 18-inch double-cone governor, each water loading.

GASHOLDERS.—No. 1, four lifts. Capacity, 580,000 cubic feet. Diameter of tank, 103 feet. Two top lifts rope-guided on Pease's principle; fourth lift added at reconstruction. No. 2, three lifts. Capacity, 130,000 cubic feet. Diameter of tank, 61 ft. 6 in. Erected 1881.

WORKS' MAINS.—Gas-mains chiefly 18 inches diameter. Holmes's valves, double-faced pattern.

TAR AND LIQUOR TANKS.—Two underground tanks, combined capacity 21 days' maximum production.

OFFICES.—Containing manager's, clerks', and foremen's offices, laboratory, and photometer-room.

WORKSHOPS, &c.—Comprising fitters', blacksmiths', and joiners' shops, and general stores.

MESSROOMS.—Stokers' room, with lavatory, shower baths, &c., yard men's room, with lavatory, cooker, &c.

On returning to the town, the members and friends, to the number of considerably over a hundred, dined together in the Palatine Hotel—Mr. Duxbury in the chair. At the conclusion of the meal, a few complimentary remarks were made by Mr. W. Doig Gibb, of London, and Alderman Gillies, of Gateshead, after which the party dispersed.

A recent number of the "Comptes Rendus" of the French Academy of Sciences contained a description by M. Gernez of a method of restoring the phosphorescence of the sulphides of the alkaline earths. The sulphides of calcium and strontium, and probably that of barium also, slowly lose their phosphorescence under the action of air and water. The author thought this loss was due to the conversion of the sulphide into non-phosphorescent sulphate; and he deduced that the phosphorescence should be restored when the sulphate was reduced to sulphide. On heating the non-phosphorescent substance in hydrogen, he found that it again acquired its phosphorescence. The same effect is produced by the action of heat without hydrogen.

JUNIORS AT BURNLEY GAS-WORKS.

Joint Visit of the Manchester and District and the Yorkshire Junior Gas Associations.

The annual joint visit of the above-named Junior Gas Associations took place on Saturday last, when the Burnley Corporation Gas-Works were inspected. The occasion had been anticipated with exceptional interest, partly on account of its being the first opportunity that many of the members had had of seeing vertical retorts in operation, and partly from the intrinsic attractiveness of the works themselves. Not a few of the visitors were fully aware of how much pioneer work in gas practice and how much valuable scientific research had been carried out at Burnley by Mr. J. Petty Leather, the Engineer and Manager, and his colleague, Mr. Raymond Ross, F.I.C., F.C.S., the Works Chemist and Borough Analyst; and the opportunity of meeting them on the scene of their investigations was one which appealed powerfully to those in touch with this branch of gas practice. Consequently, few were surprised to see a record number of visitors—between 130 and 140—especially as the town is fairly easy of access from both Lancashire and Yorkshire.

The visitors were welcomed by Mr. Leather, and were taken at once to the new retort-house, where the vertical retorts are installed. Here two large diagrams, lent by Messrs. Woodall and Duckham, were hung up, and by their aid Mr. Leather described the main features of the system. He called attention to the construction of the house, which was erected before any decision was arrived at as to whether vertical or inclined retorts were to be erected, and was of such proportions as to be suitable for either. The two main lines of steel stanchions supporting the roof were placed at such a distance apart as would correspond to the depth of a bench of inclined retorts, and also take a double row of verticals with their producers and regenerators.

As it was obviously impossible, in the limited spaces on the bench, to keep in large parties personally conducted, Mr. Leather invited the visitors to inspect the setting for themselves, throwing the whole works also open to them. Naturally the verticals were first assailed, and questions fell thick and fast on Mr. Leather, Mr. Ross, the Assistant-Chemist, the works foreman, Messrs. Woodall and Duckham's representatives, the workmen engaged, and any of the visitors who had had previous acquaintance with the plant. No description of this is necessary here, as it has recently been given in full detail in the "JOURNAL" (Vol. CVIII., p. 22). The compactness and smooth working of a plant of about a million cubic feet daily capacity was much commented upon, and the absence of heat and smoke, compared with an equivalent installation of the older methods of carbonization, was specially noticeable. Attention was perforce mainly devoted to the charging and discharging arrangements and the gas and tar take-offs. With the greatest heat at the top portion of the retort, there is a possibility of a crust forming and remaining fixed in its place, letting the charge fall away below it, but preventing the introduction of fresh coal; and close examination was given to the ingenious method by which a rod can be thrust down through the upper portion of the charge at frequent intervals without undue loss of gas.

From the vertical retorts visitors naturally turned to the adjoining new coal-stores, accommodating easily some 5000 tons of coal. In this is fitted coal-handling plant recently installed by West's Gas Improvement Company, Limited, of more than usual completeness and variety of ways of dealing with the raw material. Coal is screened and broken as soon as received, and then by a bucket elevator put into store, or else delivered to the elevator for the vertical retorts, while the floor is so arranged that coal can be taken from the store through hoppers with duplex valves, delivered into the conveyor or in its lower track in a tunnel 7 feet wide and 6 feet deep, re-elevated, and delivered down a shoot to the retort-house elevator.

The Burnley Gas-Works led the way with inclined retorts; and these were also inspected. A double bench, each of thirteen settings of sixes with a common charging-stage, provides the bulk of the make of coal gas; as much as 2 million cubic feet per day having been made here at times of special stress. Its differences from later custom in inclined settings were at once detected, such as the common charging-stage, instead of a common drawing-stage, 15-feet instead of 20-feet retorts, and especially the ascension-pipes at the top end only of the retorts.

The carburetted water-gas plant (the "Economical" type) of 2 million cubic feet capacity next came under inspection, though not actually in operation; one set being cold, and the other having its gas-making suspended for the week-end. Here, too, the gas industry is indebted to Burnley for valuable pioneer work and investigation—particularly on the suitability for gas making of the various oils on the market, and the factors that determine their suitability.

Time permitted of only a hurried inspection of the rest of the works, though most of the visitors devoted at least some attention to the complete laboratories. Anything like a real inspection of these was obviously impossible for so large a party, though the laboratory workers among the company would gladly have lingered long here with Mr. Ross, who, as already mentioned, holds the two positions of Borough Analyst and Gas-Works Chemist, and who is keenly interested in all departments of research work. Only a few weeks ago, a notable paper in connection with "The Purification of Gas from Sulphur" was read to the Manchester

Section of the Society of Chemical Industry by Mr. Ross and his Assistant, Mr. J. Race, A.I.C. (See *ante*, p. 41.) Among other items, it announced the discovery by them in carburetted water gas of a hydrocarbon—cyclopentadiene—previously only known in crude benzene from coal tar. In all these researches Mr. Leather is keenly interested; and his part in their inception and development is by no means small. It is fortunate for the future of carbonization in vertical retorts that one of the largest installations likely to be erected for some time is in the hands of an Engineer and of Chemists so competent to investigate its possibilities and to develop the conditions of its best working. New methods of gas-works practice, and especially of gas making, can only be fully examined and perfected by large-scale working; and the whole industry, especially those who in later years adopt these new methods, enter into the fruits of the labours of these earlier venturers who thus make the industry their debtors. An honoured position in this roll-call is filled by the name of Mr. Leather.

The visitors afterwards assembled at tea as guests of Alderman Emmott and Councillor Clough, the Chairman and Vice-Chairman respectively of the Gas Committee of the Corporation, who were unfortunately both unable to be present.

At the conclusion of the repast,

Mr. G. W. Shepherd, the President of the Yorkshire Association, proposed a vote of thanks to the Chairman and the Vice-Chairman of the Gas Committee for their hospitality, to the whole Committee and to Mr. Leather for permission to visit the works, and to all who had assisted Mr. Leather in receiving and guiding the visitors. He said that the general interest in the visit had been most marked, and that it had been a great privilege to inspect what was the latest development of gas making—viz., continuous carbonization in vertical retorts. They were patriotically proud that, though to foreign gas engineers they might owe some recognition of precedence as regards vertical retorts, yet to Englishmen had been reserved the accomplishment of successful continuous carbonization, which had been a long-cherished ideal seemingly almost impossible of realization.

Mr. F. Thorp, the President of the Manchester and District Association, seconded the vote. In referring to the fact that the Burnley Gas-Works had in several matters been pioneers, he gave other examples of the optimism and enterprise that Burnley and Burnley men had shown in past years. He said he was sure he was acting as spokesman for all present in wishing that Mr. Leather and his Committee might find the present installation an unqualified success, and an ample justification and reward for their courageous enterprise.

After the vote had been enthusiastically accorded,

Mr. Leather returned thanks on behalf of all concerned, who had, he said, been pleased to receive and help the visitors. With regard to his vertical retorts, he was not in a position to give any figures as to the working results. When approached nearly twelve months ago for permission for the visit, he hoped the plant might be working independently by the time the visitors came. Partly, however, from it being still in the contractors' hands, and partly owing to the gratifying fact that they were selling 10 per cent. more gas than at the corresponding period last year, they had not yet been able to shut-down the inclined retorts; and as all the gas from inclines and verticals mixed at the exhauster, and was purified and measured together, they had as yet nothing more than inferential data as to the results of the new plant. He agreed that continuous carbonization was an ideal, and more than twenty years ago he had pored over the illustrations of a suggested plant in "King's Treatise," made fresh diagrams, and tried to work out a practicable plant. The risks and expense always seemed too great for him to dare to recommend his Committee to experiment in this direction. When Messrs. Woodall and Duckham, in experimenting at Bournemouth, began to get satisfactory results, he went there to see their work, and came to the conclusion that they were approaching success. He laid the matter before his Chairman and Vice-Chairman, other inquiries followed, and finally the whole matter came before the Committee. He was then instructed to erect a new retort-house, which, as he had before explained, was to be constructed so as to be equally suitable for inclines and verticals. Meanwhile, they continued to watch the Bournemouth experiments with interest; and finally, when he saw the risk was not too great, he advised the erection of the bench the visitors had seen in operation. He was conscious that he had incurred a great responsibility; but he believed they would be able to make a great success of it. Large-scale working was much more difficult than small and experimental working. Here the main difficulty was the need, if he might be permitted so to express it, of curing an evil before the evil came. They must be continually on the watch. With any kind of intermittent working, a small defect could be set right the next time of charging. But with continuous carbonization the next time was the next minute; and if the defect was not at once remedied, working became less easy and successful, until soon a standstill might result. Their men had to be trained, and had to gradually acquire such familiarity with the plant as would enable them to see promptly, and even anticipate, any weakness in working. Then, too, even if they did not need a different type of man, the men would have a very different type of work. With horizontal or inclined retorts, when a charge was once in a tier of retorts, but little supervision was needed; and for about 1½ hours they might not have to think of what was going on. With continuous carbonization in vertical retorts, no such periods of rest were possible, and alert supervision must be uninterrupted; then success would be possible.

SUITABLE ROAD TARS.

Following the paper on "Up-to-Date Roads," read by Mr. R. O. Wynne-Roberts, M.Inst.C.E., at the meeting of the Society of Engineers yesterday week, there was an animated discussion. Portions of the paper referring to the use of tar on, and in the construction of, roads were given last week; and only the parts of the discussion bearing on this question are now reported.

Mr. H. P. Maybury, M.Inst.C.E. (Kent County Surveyor), in his remarks, said that last year the Kent County Council spent £13,000 in dust abatement and incidental improvement. The great alteration that had taken place in road traffic since 1903 must not be overlooked. Until that year, the motor-car was not legalized to go at a greater speed than 12 miles an hour; and he believed then there were not 1000 motor-cars in England; while at the end of last year, 190,000 motor vehicles were registered for use on the roads of this country. Mr. Wynne-Roberts suggested it would not be an impolitic thing to have a tar-still upon the side of the highway. He (Mr. Maybury) did not know whether the author of the paper had had charge of highways lately, and had been using tar on the roads. If he had, he would know that the very sight of a tar-boiler was almost to the neighbours like a red rag to a bull. He had had to deal with numerous claims made in consequence of a tar-boiler being upon the road. Only last year he had to defend an action for (so it was alleged) poisoning a cow. The County Court Judge believed it; and his Council actually had costs cast against them. He had had claims for damaging damson trees, hops, and a thousand-and-one other things. He did not know where he would land himself if he now put a tar distillery on the road. There was no doubt that tarring had a very beneficial effect upon the life of macadamized roads. He went so far as to say that, without tar treatment, with all the heavy motor traffic they now had on the main trunk roads, it would be impossible to hold them together. At the same time he did not think that tar painting was the last word on the maintenance of roadways; still it did go a long way to meet the requirements of the present traffic, and to reduce the road bill. In his own county, they had some 750 miles of road; and last year he treated 303 miles with tar. And he was glad to say they had not so far got up to the expenditure that obtained in 1902. In that year the main roads of the county cost £162 per mile; last year (he thought he was right in saying), including tar painting and improvements, they cost £137 per mile. The reduction in cost was due to the fact that they had bought material—granite, and so on—on more favourable terms than prior to 1902. A great part of the outlay for tar painting (£13,000) was therefore saved by the reduced cost of other material. With Mr. Butterfield, they had been making various experiments in the endeavour to get a proper and suitable bituminous binder, which should to some extent supersede the crude tar in tar painting, or at all events would have the effect of giving them a road with elasticity to withstand high-speed traffic. Speed must not be ignored. If they had a motor-car or traction-engine going at the rate of 2 miles an hour, the strain on the roadway was nothing like so great as if a vehicle was travelling at the rate of 40 miles an hour.

Mr. W. J. A. Butterfield, F.I.C., remarked that, though he was not responsible for the maintenance of roads, he had had some experience of the manufacture of tar, and of specifying tar of a suitable character for the painting of roads. However interesting it might be to know all about coal tar, he was not quite sure that he agreed with Mr. Wynne-Roberts that it was very helpful to the road engineer that he should understand how it was manufactured. As a matter of fact, a little knowledge of its manufacture might lead to very dangerous errors. Passing on to the relation between the specific gravity of tar and its applicability to roads, as a matter of fact, he believed the specific gravity had very little bearing indeed on the suitability of a tar as a binder. It did not, so far as his (Mr. Butterfield's) knowledge went, as Mr. Wynne-Roberts would imply, connote that a tar contained a certain proportion of free carbon, or that a tar would have a certain viscosity. The properties of coal tar depended almost entirely upon the temperature at which the coal had been carbonized, and the character of the coal was of practically no account provided the temperature of carbonization exceeded a certain minimum. Then as to the free carbon, it certainly had no binding value. He thought, too, that Mr. Wynne-Roberts's permissible maximum of 25 per cent. was much too high. In specifications he (Mr. Butterfield) had drawn up, he had usually put it at 16 per cent. Again, as to the density—the specific gravity—of refined tar, the author put it at 1·25. This was higher than he (the speaker) thought practicable for the average tar distiller to produce; and 1·20 to 1·22 was practically the average density of tar that was suitable for road painting. For manufacturing a grouting material, a different tar altogether was required. He was rather struck by the author dealing with loads on roads as though they were static or slowly rolling loads; and he did not notice that Mr. Wynne-Roberts took any account of the speed of rotation of the wheels. It seemed to him (Mr. Butterfield) that the necessity for the tar treatment of roads had come in with the increased speed of traffic. The wheel of the motor-car might be regarded as a grindstone; and the road the article that was being ground. If the grindstone was revolved fast enough, the road surface would be worn away very quickly; if the surface was one

that was easily ground up or disintegrated, the wear and tear on the roads would be very great. To avoid this wear and tear being excessive, the surface of the road had to be bound together with very viscous or colloidal material, which was tenacious and was not easily torn apart by the revolving wheel. He conceived this was somewhat the condition with which they had to deal. The rapidly rotating wheels that passed over the roads to-day were the *raison d'être* of the application of tar to the surface of roads. Tar was not easily pulled apart once it was set; and it incidentally prevented the lumps of road material being separated. It also prevented the pieces being ground one upon the other, and thus broken up, and the whole road surface disintegrated. In regard to many points in connection with the analyses of tars, the paper was necessarily very general; and there must be points of disagreement. But there was one upon which he should like to warn engineers who made their own tests of tar, upon which the author had not been sufficiently explicit—that was, with respect to viscosity. Viscosity of a liquid such as tar was very largely a function of temperature. It all depended upon the temperature at which the test was made. A tar highly viscous at 40° Fahr. would be a relatively fluid tar at 70° Fahr. There was no reference, in the author's description of testing for viscosity, to the fact that temperature was an extremely important factor; and obviously a tar that was suitable for road use must be one that was of fairly uniform viscosity over a wide range of temperature.

Mr. Reginald Brown said there were no doubt varying qualities of tar; but he did not entirely agree with the author that they as road engineers need trouble themselves much as to how varying qualities of tar could be produced. This was a matter that could be left to experts like Mr. Butterfield. There was no doubt that, owing to the use of carburetted water gas and oil gas, there were tremendous differences in the quality of tar from gas-works. There was great difficulty in getting out the water from the tar by simple deposition. He knew for a fact that they could get oil tar of as low a specific gravity as 1·08, which was slightly above water. For the past three years he had been using only oil tar on the surfaces of the roadways; the advantage being that they obtained a low percentage of pitch in it. They got 58 per cent. of pitch in ordinary coal tar, and about 14 or 15 per cent. in oil tar. The pitch in the latter was in such a liquid condition that it permeated the whole of the road surface much quicker than ordinary coal tar; and the more they could get the pitch (as it were) into the interstices of the road material, the better bound road would be the result. He had found that oil tar would permeate 2 inches with a cold dressing. Ordinary refined coal tar dressing would cost 1d. per yard super.; while oil tar dressing could be done at less than ¼d. per yard, or five dressings for 1d. With five dressings (which few roads would require) in the course of an ordinary season, an equally efficient road could be obtained as by the use of coal tar. By using, too, the finer material, with the smaller amount of pitch and in a more liquid state, so as to allow it to percolate well into the road, sand or chippings were not required on the surface, because in two or three hours the surface of the road was fit to walk upon. He preferred hand painting; but the use of machinery was necessitated for rapidity.

Mr. Wynne-Roberts, in the course of his reply, admitted at once that viscosity could not be ascertained with anything like reliability unless the temperature was taken into account. He also agreed that vehicular speed should be taken into consideration in relation to the questions raised in the paper. Also that the introduction of a tar-distillery on the roads was not an ideal thing. But his point in this connection was that it facilitated work. Many authorities might not have distilling plant anywhere near the work that was being done, or at an economical distance. Therefore they had to rely upon the use of crude tar. To meet these conditions, the alternative was the portable distillery; and experience would teach where in a roadway the boiler could be put so as to avoid nuisance. Mr. Butterfield had mentioned that specific gravity did not connote the percentage of free carbon in the tar. But other eminent chemists and tar distillers agreed that specific gravity did connote the presence of free carbon.

Mr. Butterfield asked permission to say that, within a limited area where the gas-works were using the same descriptions of coal, and the same methods of carbonization, the specific gravity of the tar probably did indicate roughly the proportion of free carbon in it. But taking a wide area—gas-works scattered all over the country, using different coals and heats—it could not be said that the specific gravity of tar had any definite relation to the proportion of free carbon in it.

Mr. Wynne-Roberts said that the information he had pointed to the formula given in his paper being more or less accurate for all tars. He did not say it was entirely accurate for Metropolitan tars. Mr. Butterfield had said he stipulated that free carbon should not exceed 16 per cent.; and that would eliminate the Metropolitan tars, which contained more than that. In fact, he thought it would be found, from the free carbon returns of the country, that 16 per cent. was too low; hence his (Mr. Wynne-Roberts's) reason for adopting 25 per cent. From the analyses he had, it might be concluded at once that many tars in this country could not be used for road purposes. The specific gravity of 1·25 might be a little high; but still he thought some of the tars sold to-day reached this point. A slight modification, however, might be necessary.

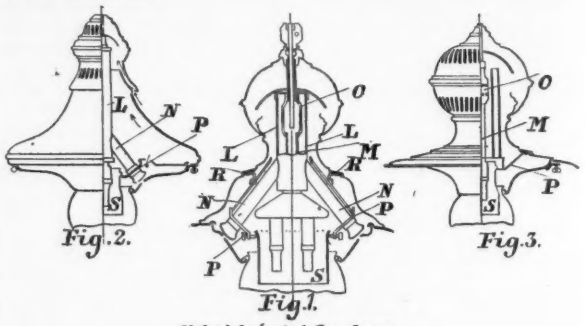
REGISTER OF PATENTS.

Inverted Gas Lamps and Burners.

Helps, George, of Nuneaton.

No. 2651; Feb. 4, 1909.

By this invention, the air casing of a lamp may be in several parts supported without bolts or nuts—"a considerable advantage where enamelled iron casings are used"—and ready access obtained to all parts of the burner.



Helps' Inverted Gas-Lamp.

Fig. 1 shows one form of the lamp. L is the air casing, M the burner-tube, N tubes supplying air to the nipple through an air-chamber O, and supporting a flanged ring P, holding up the lamp casing by means of a second flanged ring or chimney having brackets or flanges R. The first-named flanged ring carries the chimney or draught inducer S.

Fig. 2 shows in part section and part elevation another form of the invention. Here the lamp referred to in patent No. 20,762 of 1908 is shown. The whole of the lamp casing Q is supported by the flanged ring P.

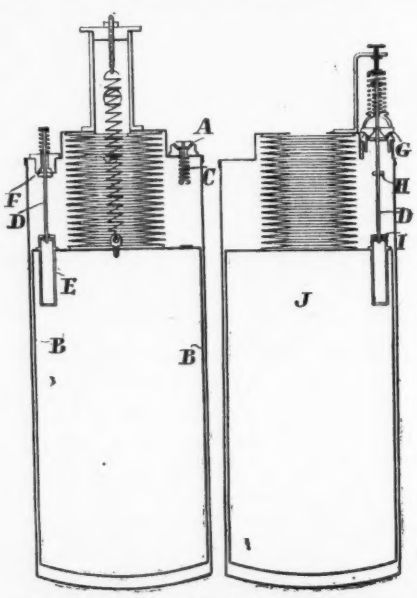
Fig. 3 shows a method of supporting a lamp by one flanged ring composed of several sections, and in which there is no air casing. M is the burner-tube, O is the air-chamber, and P is the flanged ring to which the chimney is attached.

High-Pressure Gas-Lamps.

Chipperfield Lamp Syndicate, Limited, of Victoria Street, S.W., and Browning, E. M., of Buckhurst Hill, Essex.

No. 8450; April 7, 1909.

This high-pressure gas-lamp is of the type described in patent No. 20,521 of 1906; the objects being to obviate the use of slide valves—substituting mushroom or disc valves therefor—and also the provision of a silencing device, whereby the noise resulting from the exhaust and intake actions of the valve is considerably reduced.



The Chipperfield High-Pressure Gas-Lamp.

In the first arrangement shown, the outer vessel is fitted with an exhaust port A, opened or closed by a mushroom or disc valve, so constructed that when the inner vessel or displacer B is at any portion of its upward or downward stroke, it will not be in contact with a rod C for operating the valve. The rod passes through the port A to the interior of the outer vessel until the displacer is almost at the end of its upward stroke, when it will come into contact with the inner end of the valve rod C and raise the valve from its seat, thereby opening the port A and permitting the escape of the heated air. The valve-rod is caused to follow the displacer B in its downward movement, by the action of a spring, until the port A is again closed.

The intake valve consists of a reciprocating rod D, the inner end of which is connected to the displacer B through an opening in a small closed chamber E, formed partially within the displacer as shown; the port F being normally kept closed by a spring attached to the upper portion of the rod D, which holds the mushroom or disc valve secured to the rod against its seat on the under face of the port. The inner end of the rod D is provided with an annular projection, which comes into contact, during the downward movement of the displacer, with the top of the closed chamber E, through which the rod passes, thus opening the valve F and permitting the intake of air from the atmosphere.

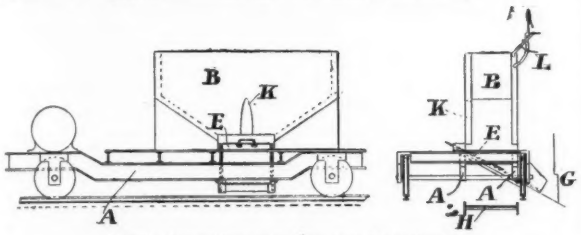
In the second arrangement, the intake and the exhaust valves are combined; the arrangement being such that when the reciprocating rod D has almost reached the end of its upward stroke, the port G will be opened by the valve being raised from its seating, consequent upon the annular projection H coming in contact with the top of the closed chamber I, which will have caused the rod to travel upward with the displacer J until the valve is lifted, permitting the escape of the heated air to the atmosphere.

Directing Coke from Gas Retorts to Furnaces or Alternatively to Conveyors or Trucks.

HUNT, P. C. H., of South Yarra, Victoria.

No. 8848; April 14, 1909.

This invention relates to means whereby the coke from retorts may be removed in its hot condition and delivered into the furnace used for heating such retorts, or, alternatively, for receiving the coke from the retorts and delivering it upon a conveyor or into trucks; so that it may be taken to any predetermined spot for cooling and storage.



Hunt's Travelling Platform and Coke Screen.

The illustration shows a longitudinal elevation and end view of apparatus embodying the invention, which was referred to and illustrated in the course of an article by the patentee in the "JOURNAL" for Nov. 2 last year, pp. 307-11; as also in his Presidential Address to the Victorian Gas Managers' Association—see "JOURNAL" for Feb. 15 last, pp. 423-30.

The patentee employs a combined travelling platform A and coke-shoot or hopper B in connection with machinery, wherein the coke is discharged from the retorts at one end, either by means of a pusher or ram, or by gravitation when the retorts are inclined. The platform (of steel construction) is mounted on wheels running on rails on the floor of the retort-house. The hopper B has a movable bottom plate E (working in guides), which, when in position, deflects the coke into the furnace entrance at G or, when removed, allows it to drop through the floor into trucks or on to a conveyor H. When it is desired to feed the coke into the furnace, the platform is placed with the shoot opposite the retort to be discharged; the movable bottom plate E being left in position, so that the coke as it comes out of the retort is deflected into the furnace. A slot K in the back-plate allows the workman to see the coke falling into the furnace, and affords him facility for assisting to fill it.

When it is not required to put the coke into the furnace, the bottom plate E is withdrawn, and the coke is allowed to drop through on to a conveyor H or into trucks beneath. Flaps L are provided on the front of the shoot, to divert the coke from the retort mouthpiece into the body of the shoot.

The slot K is of such dimensions as will allow of the working of a poker therein to assist the falling of the hot coke, when in the hopper, to either the furnace opening G or receptacle H beneath for removing the surplus coke.

Imparting Rotary Motion to Gas Taps from a Distance.

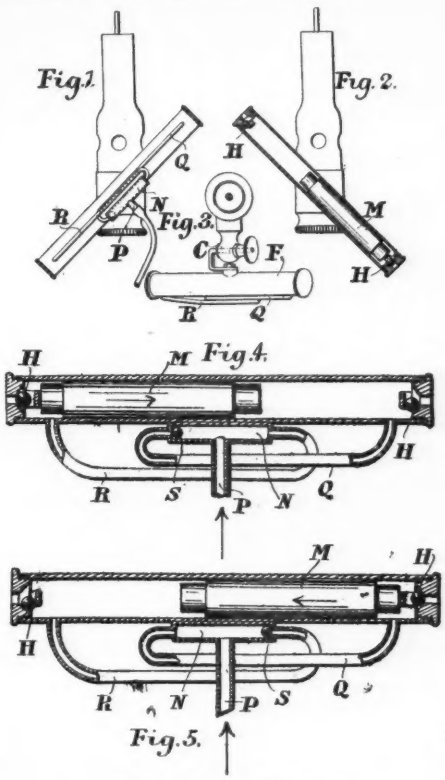
PEGLER, B. C. H., of Kingston-on-Thames.

No. 11,133; May 11, 1909.

This invention relates to means for turning on and off a tap for the supply of gas to a burner, in which a weight is caused to move from one end to the other of a vessel pivoted toward its middle and actuating the gas-tap; the weight being caused to move from side to side of the fulcrum by variation of fluid pressure. Thus, by compressing a bulb at any distant point, the heavy piston can be alternately driven from one end to the other of the cylinder, causing a rocking motion of the cylinder and the plug to which it is attached. At each end of the cylinder is a ball valve opening inwards when the ball is off its seating. When the cylinder is tilted with the right end upwards, the air enters on the left end or lower side of the cylinder, and the ball closing over the valve will not allow the exit of the air from the cylinder, and, therefore, it drives the piston to its highest position, tilts the cylinder over, and thus turns the gas on. The air in front of the piston is driven out upwards through the open valve; the ball having in the meantime fallen away from its seating.

Fig. 1 is an elevation of a burner with the device fitted. Fig. 2 shows the mechanism in another position. Fig. 3 is a plan of fig. 1. Figs. 4 and 5 are diagrammatic views explaining the action of the mechanism.

The burner fitting is provided with an ordinary tap; but through the hole through which the lever actuating the tap is usually passed is inserted a screw pin C, held in position by a screw nut. The pin is bent twice (as shown at fig. 3) and is attached to a cylinder F, provided at each end with a cap having a central perforation. Beneath each perforation, and within the cylinder F, is a small ball valve H, kept in the neighbourhood of the hole by a bar attached to the cap. M is a heavy piston fitting closely, but moving easily in, the cylinder F. N is a valve-chamber attached to the cylinder and having a pipe P leading from some source of air pressure. The ends of the valve-chamber N communicate by pipes Q and R with opposite ends of the cylinder. The valve-chamber N is provided with a small ball S.



Pegler's Gas-Tap Actuator.

In action, supposing the parts are in the position shown in fig. 1, and that a pressure of air is created in the valve-chamber N by means (say) of an air-bulb blowing through the pipe P, the air can only pass through the pipe R, since the ball S closes the other pipe Q. Consequently, the air passing down the pipe at R comes below the piston M; and as the ball H at this end is over the hole in the cap, the air forces the piston to the opposite end of the cylinder, causing it to overbalance and turn the tap, allowing the gas to light by means of a pilot flame. When it is required to turn off the gas, it is simply necessary to again squeeze the air-bulb, when the operation will be reversed, as the ball S will have fallen over to the other end of the valve-chamber N, and closed the passage R; and the air will thus be compelled to pass through the pipe Q and actuate the piston M in the opposite direction. In each case the motion of the piston is not impeded by the air in front of it, as the ball H at the forward end drops on to the cross-bar.

Kindling Devices for Burners.

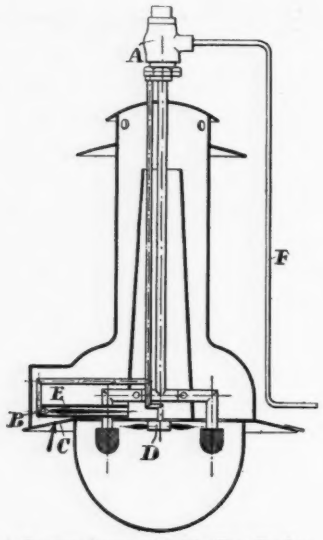
NEUE KRAMERLICHT G.M.B.H., of Charlottenburg, Germany.

No. 13,787; June 11, 1909. Date claimed under International Convention, June 15, 1908.

This invention essentially consists in the provision of a tube adapted to conduct an elongated pilot flame from one end to the interior of the casing, and which flame, on issuing from the other end of the tube, ignites the unburnt gases and causes the mantle to be lighted. In view of the manner in which the kindling flame is conducted, the collection of a quantity of gas in the lamp interior is prevented; the gas escaping through the burner being at once carried off by the chimney, so that "it is impossible for an explosive mixture to form."

The gas enters at the top of the lamp (p. 382), and is distributed to the down pipes by a multiple-way cock A; one of the down pipes conducting the gas to the inverted burners and mantles, while the other pipe leads to the kindling flame burners B. The latter burners are accessible through an opening C; while a number of burners D, arranged in the middle of the lamp, transmit the ignition to the main burners. The burner B is either arranged in proximity to the wall of the lamp casing or else in a projecting portion of the casing; so that the lighter can conveniently be brought into contact with it through an opening in the casing. Preferably the gas current issuing from this burner is given a horizontal direction towards the interior of the lamp; and in order that the gusts of air shall not be able to deflect it from the desired direction, a pipe E is fitted to the burner, and beneath the mouth of the burner presents an opening for the kindling of the gas, while its other end opens into the lamp chimney. An arm F extends downwards from the cock A, so that it can readily be turned around the lamp by means of the lighter, and thus open or close the cock.

Preferably the passages in the cock are so constructed that when the arm F has been rotated a certain distance the gas is supplied to the



A German Lamp with Kindling Device.

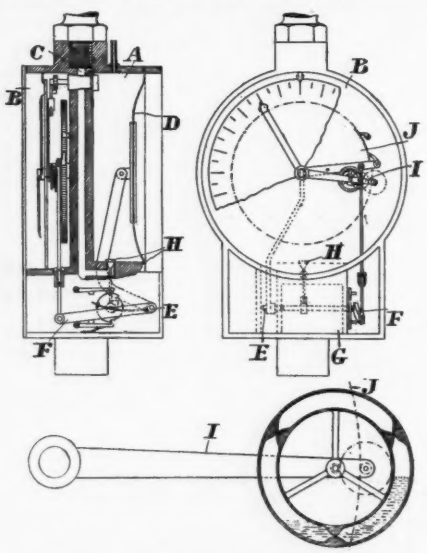
kindling pipe, and through branches of this latter to the burners B D, whereupon the lighter is inserted in the lamp through the opening C, and the gas kindled. If the arm is further rotated in the same direction, the gas is also admitted to the main inlet pipe. The gas which then issues from the burners at once becomes kindled at the flames D and the incandescent mantles. If the arm is rotated into its end position, the supply of gas is cut off from the main supply pipe, so that all the kindling flames are extinguished and only the mantled burners are supplied. If, however, the arm is rotated in the opposite direction in the first place, the gas is again admitted to the main pipe, and the gas issuing from the kindling burners becomes kindled at the illuminating burners.

Self-Acting Gas-Lamp Igniter and Extinguisher.

GERDES, A. F., of Berlin.

No. 19,258; Aug. 21, 1909.

This is an apparatus "for the automatic ignition and extinction of gas-lamps at certain times of day determined automatically by the apparatus itself; the gas which feeds the permanent jet flame acting as in a gas-meter on a distensible device (for instance, a diaphragm) in consequence of the rythmical movements of the same, and driving the regulating mechanism of the valve or cock controlling the luminous flame." By the movements of the diaphragm, the valve-controlling admission to the diaphragm chamber is suddenly opened and closed; and the movements communicated to the regulating mechanism are timed by the stroke being limited in its action by a regulator.



Gerdes' Lamp Lighter and Extinguisher.

The casing is divided (as shown) into two chambers A B by a wall which contains a passage C leading to the burner. In front of the chamber A the diaphragm D is interchangeably mounted, and the swinging plate connected with the diaphragm is connected with the shaft E. On this shaft (away from the flow of the gas) are fastened a spring and weighted lever F, which transmits the movements of the diaphragm to the timing mechanism; so that both must follow the movements of the plate on D. In this manner, the spring, through its connection with a switch held fast by one of two pawls, is kept in tension until the lever F releases the pawl which is holding the switch, and the latter is thrown round by the tension of the spring, so that the other pawl engages with the tooth on the switch which then lies next to it.

The gas enters the ante-chamber G and flows uninterruptedly to the cock; and as the valve H, on account of the weighted lever F, must be open, the gas can also enter behind the diaphragm D, thus moving it and the diaphragm plate out. The rythmical movements then succeed each other without interruption, so that the lever with a regulator I rolls on the toothed wheel J through a certain distance, and is raised again through a certain distance without the regulator stopping, because the weighted lever F turns the toothed wheel J only as far as the regulator has rolled on the periphery of the toothed wheel, so that, in spite of being driven non-uniformly, the motion of the mechanism is timed sufficiently accurately.

The inlet to the diaphragm chamber is much larger than the outlet to the permanent flame; so that, by means of the gas pressure, the toothed wheel is driven suddenly and powerfully, while the movement of the regulator is such that, on descending, it lags behind, and is independent of the lever F, which, because of the slow rate of flow of the gas to the jet flame, sinks slowly. Thus great differences in pressure in the main line have no influence on exact ignition and extinction at the times set.

The regulator (shown separate) is a fluid regulator; the fluid—quicksilver or glycerine—being contained in its hollow circular rim, which is provided with three restrictions for retarding the flow of the liquid during the rotation of the regulator. The weight of the liquid tends to rotate the regulator through the latter being geared through toothed wheels with the wheel J, and the restrictions cause this rotation to be retarded to the desired extent.

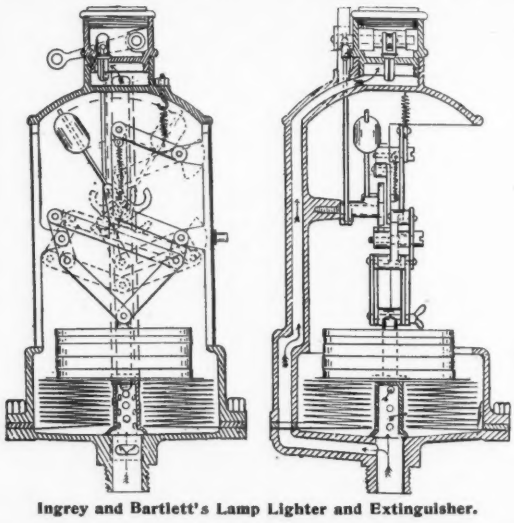
Lighting and Extinguishing Gas.

INGREY, C., of Holborn Viaduct, E.C., and BARTLETT, J., of Camberwell, S.E.

No. 19,206; Aug. 20, 1909.

The object of this invention is to provide means whereby street lamps can be simultaneously ignited or extinguished under control from the gas-works or district station, by transmitting a slightly increased pressure of gas through the mains to the lamps.

In carrying out the invention, the patentees connect directly on to the admission pipe a casing or chamber in which a piston works, or, preferably, a diaphragm, which may be weighted down to a load in excess of the ordinary working pressure, so that the piston or diaphragm will not rise until an increased pressure acts upon its surface.



Ingrey and Bartlett's Lamp Lighter and Extinguisher.

The arrangement shown is such that the pressure will act only upon one side of the piston or diaphragm; the other side being open to the atmosphere. The chamber is connected by a pipe or channel to a valve box above the piston or diaphragm, which latter is caused to operate a rocking bar or tumbler and so give motion to a fall-over lever, in such a manner that when the lever falls in one direction it will cause a valve to be opened and in the other direction to close it. The rocking bar or tumbler is pivoted with an inclined or wedge-shaped projection, on one or the other side of which a roller or pin can travel when the piston or diaphragm takes an upward movement. The roller or pin is carried by a lever or arm pivoted to a standard or spindle capable of rising or falling with the piston or diaphragm. When, therefore, the latter is caused to rise by the excess of pressure, it will, in one case, operate the rocking bar or tumbler and open the valve; when the excess of pressure decreases, the piston or diaphragm will descend to its normal position and remain so until the pressure is again increased, when it will again rise, and in this case reverse the action of the rocking bar or tumbler, and so close the valve.

In order to regulate the apparatus, so as to deal with any predetermined pressure of gas, the piston is so arranged that it is capable of receiving upon its upper side a number of metal discs or weights marked to denote the pressure they represent; and for the purpose of obtaining a finer adjustment, there is a hinged lever carrying a weight which can be moved farther from, or nearer to, its pivot, and so apply more or less weight to the piston or diaphragm.

Reduction in Price at Wallingford.—From June 25 next, the price of gas at Wallingford will be reduced from 3s. 9d. to 3s. 6d. per 1000 cubic feet.

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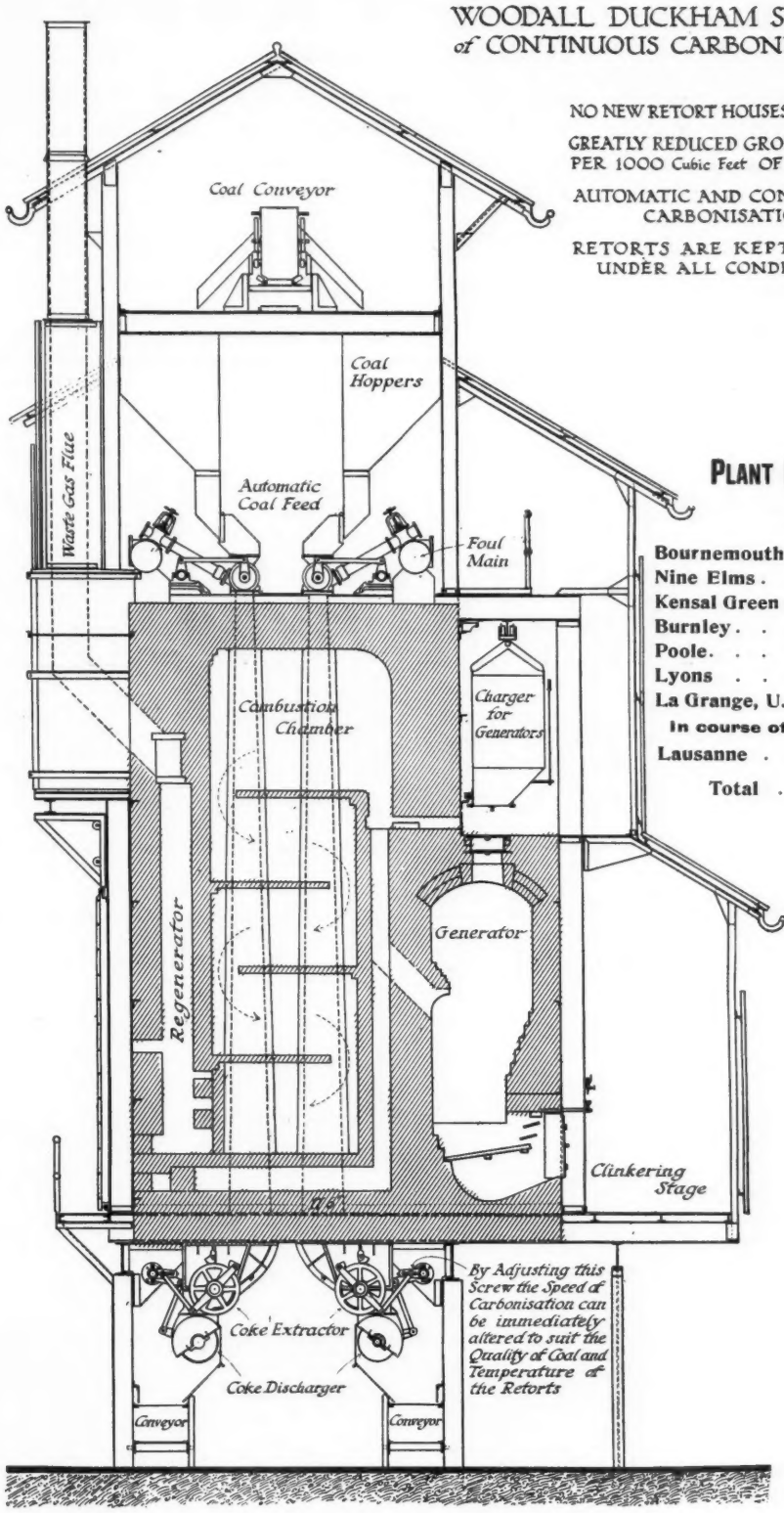

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Kensal Green	1,250,000
Burnley	1,125,000
Poole	50,000
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La Grange, U.S.A.	125,000
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Lausanne	1,500,000
Total	4,700,000

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PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

The following further progress had been made with Bills at the rising of the House for the spring recess:—

Bills brought from the Commons, read the first time, and referred to the Examiners: Glasgow Gas Consolidation Bill, Worksop Urban District Council Bill.

Bills read a second time and committed: Little Hulton Urban District Council Bill, Mallow Urban District Gas Bill, Pontypridd Water Bill.

Bills reported: Aberdeen Corporation Water Bill [preamble not proved], Great Grimsby Gas Bill, Havant Gas Bill.

Bill Royal Assented: Wicklow Gas Bill.

The Gas Orders Confirmation Bills No. 1 (relating to Brownhills and District, Builth Wells, Chertsey, Cranleigh, and Llanidloes), No. 2 (relating to Burnham in Somersetshire, Dinnington and District, Dunblane, Highbridge, and Pinner), and No. 3 (relating to Ripley, Rowley Regis and Blackheath, Sheffield, and Swansea), and the Water Orders Confirmation Bill (relating to Barnstaple, Chelsham and Woldingham, East Kent district, and South Kent), were presented on the 28th ult., read the first time, and referred to the Examiners.

HOUSE OF COMMONS.

The following further progress had been made with Bills at the rising of the House for the spring recess:—

Lords Bill read a second time and committed: South Lincolnshire Water Bill.

Bills reported, with amendments: Bishop's Stortford, Harlow, and Epping Gas and Electricity Bill [Lords], Bristol Gas Bill, Gowerton Gas Bill [Lords], Pontypridd and Rhondda Joint Water Board Bill, Rhondda Urban District Council Bill.

Bills read the third time and passed: Glasgow Gas Consolidation Bill, Worksop Urban District Council Bill.

LEGAL INTELLIGENCE.

CONNECTION OF GAS-MAINS TO PUBLIC LAMPS.

HIGH COURT OF JUSTICE—KING'S BENCH DIVISION.

Wednesday, May 4.

(*Before Mr. Justice* PHILLIMORE.)

Liverpool United Gaslight Company v. Corporation of Liverpool.

The hearing of this action, which was commenced on the 20th ult. (see *ante*, p. 251), was resumed to-day.

Mr. DANCKWERTS, who appeared for the defendants, reminded his Lordship that the point in dispute was whether there was an agreed price to cover the cost of lamps in certain passages in Liverpool, which really appeared to be a question of fact; and the Corporation took the view that the agreement did cover the lamps. He would suggest that the proper course was to refer the matter back to the Arbitrator.

Mr. MACMORRAN, representing the plaintiffs, said there was an agreement in existence with regard to street-lamps; and when it was sought to apply it to lamps in passages, it was repudiated altogether. So that from the very earliest stage it was impossible to say that there had been an agreement with regard to these lamps—assuming they were public lamps.

Justice PHILLIMORE said he thought the lamps were public lamps, and that the plaintiffs were bound to light them. But the terms on which they should do so were a matter for agreement under section 41 of the Act of 1848. It might be referred to the Arbitrator to find whether or not there was any agreement.

Mr. MACMORRAN thought it an extraordinary thing if gas companies were liable to light public lamps in private passages when they had no statutory power to lay the pipes. The real question here was as to whose duty it was to lay the pipe from the main to the lamps in question. His submission was that the matter was regulated by section 41 of the Act of 1848, and that section 24 of the Gas-Works Clauses Act, 1871, had no application, as it was not the controlling section.

Justice PHILLIMORE said section 41 was the controlling section. The Gas Company were bound to light the passages and to make their own terms—subject to this, that if they could not agree, the matter must go to arbitration. The point was not raised by the special case for the Court to decide.

Mr. DANCKWERTS agreed that it was not, and said his Lordship could only decide it as an arbitrator. He suggested that his Lordship should declare: (1) That the lamps were public lamps; (2) that there was a statutory duty on the part of the Company to lay the pipes up to the lamps; and (3) that the parties who were to pay for the work must depend upon the agreement.

Mr. MACMORRAN: Agreement, if any.

Mr. DANCKWERTS said he was prepared to go a step further, and say that, if there was no agreement between the parties as to these particular lamps, the Arbitrator should decide what was to be the price to be paid for the gas, inclusive of the charge for laying the pipe.

Mr. MACMORRAN said the parties were before the Court on the assumption that there had been no agreement with respect to lamps in passages.

Justice PHILLIMORE: If you have done the work under contract, there must be some implied promise to pay.

Mr. MACMORRAN: If there is an implied promise, I do not mind.

Mr. DANCKWERTS: The price must be fixed with reference to the duty of the Company to lay pipes up to the lamps and to supply gas.

Justice PHILLIMORE: I think the Company have a statutory duty to do the work, but not at their own expense. The question as to who is to bear the cost of the work done is a matter of agreement; and it will be referred back to the Arbitrator to decide that point.

After further discussion,

Justice PHILLIMORE made the following declaration: "That the Gas Company were under a statutory duty to do the work in all cases in which the lamps in connection with which the work was done were public lamps; that the lamps in the unadopted passages were public lamps; that the Company were not, by reason of the section, under a statutory duty to do the work at their own expense. As to whether the work should be done at the expense of the Company or of the Corporation, his Lordship declared that this point, like the question of the price to be charged for the gas, was a matter of agreement between the parties; and if they could not come to an agreement, the matter was to be determined by arbitration, in accordance with the provisions of the Act. He referred the case back to the Arbitrator, to find out whether there was any such agreement; and in the event of his finding that there was none, either express or implied, he directed him to report specially. He gave liberty to apply; and the costs were reserved.

A Gas Company Fined.

At the Tottenham Police Court last Thursday, the Tottenham and Edmonton Gas Company were summoned by Mr. R. A. Robinson, Chief Inspector of the Middlesex County Council, under the Weights and Measures Act, for having in their possession for use in trade six unjust weights, and also two weights that were unstamped. An inspector stated that on March 9 he examined the weighing machines and appliances at the Gas Company's premises, and found five 56 lb. weights which were from 3 to 6 oz. light, and one 28 lb. weight which was between 1 and 2 oz. light. Two of the weights were also unstamped. Some of the weighing machines were unstamped and unjust. Mr. Phillips (for the Company) admitted that there were technical offences; but he said that the weights were used for weighing 2 cwt. bags of sulphate of ammonia, which were afterwards checked on a weighbridge. No complaints had ever been received by the Company of shortages. The action of sulphate upon iron caused the weights to depreciate. The Bench imposed a fine of 10s. and costs on each summons.

Gasholder Inlet and Outlet Pipes.

An Engineer writes: I note on p. 315 in the number of the "JOURNAL" for the 3rd inst. two French proposals in regard to inlet and outlet pipes for gasholders. In my opinion, one fatal objection to the rectangular pipe in the first patent referred to is that it is very liable to get stopped up with naphthalene. It is a sufficient difficulty with the ordinary smooth-bore round pipes; but to have a narrow flat pipe of wrought iron with sharp angles about it would further considerably the deposit of naphthalene. The more sharp corners and angles are avoided the better. Again, such a narrow pipe would be extremely difficult to clean out. In large gasholders, the inlet and outlet pipes are generally made large enough for a man to get inside; but this could not be done with the French flat pipe. As to the other patent, it is a striking example of theory untempered by practice.

Winsford's Successful Gas Undertaking.

At a meeting of the Winsford (Cheshire) Urban District Council last Tuesday, Mr. F. Sidwell, the Gas Engineer, gave some particulars as to the excellent progress made by the gas undertaking. The total receipts for the year ending March 31 amounted to £5941. The quantity of gas made was 28,950,000 cubic feet, as against 28,979,800 cubic feet the previous year. The gas sold to consumers was 25,404,642 cubic feet, an increase of 657,212 cubic feet, or 2·6 per cent. The gas unaccounted for equalled 8·28 per cent., or 2,397,638 cubic feet; being 2·36 per cent. less than the previous year. The quantity of cannel carbonized was 272 tons, and of coal 2303 tons. The gas made per ton of coal carbonized was 11,237 cubic feet. The average make for the last four years was 11,282 cubic feet per ton. The quantity of lime used for purification and retorts was 55 tons 12 cwt.; being a decrease of 106 tons as compared with the previous year. The actual saving in five months, during which time the new scrubbers, purifiers, and condensers were at work, was £98. Mr. Sidwell estimated that the annual saving by the new plant would be £116, which would more than cover the interest and principal required to repay the loan on it.

Gas Prices and Profits at Nottingham.—Nottingham having been faced with the prospect of a 2d. increase in the rates, the Gas Committee held a special meeting, and decided that they will pay over out of their profits £4000 more than they had first agreed upon and the Finance Committee had accepted. They have also determined to reduce the price of gas to private consumers by 2d. (from 2s. 6d. to 2s. 4d.) per 1000 cubic feet. In consequence of this additional contribution—£35,000, instead of £31,000—only an increase of 1d. in the rates will be necessary.

Winding-Up of the South Luton Gas Company.—An extraordinary general meeting of the South Luton District Gas Company was held last Tuesday, to consider the following resolution: "That Mr. Augustus Edwards, chartered accountant, of Capel House, New Broad Street, London, E.C., be and is hereby appointed Liquidator for the purpose of winding-up the Company." Only three gentlemen were in attendance; and the proceedings were very brief. Mr. Knapton (who presided) formally moved, and Mr. Bryan seconded, the resolution; and it was declared carried.

MISCELLANEOUS NEWS.

IMPERIAL CONTINENTAL GAS ASSOCIATION.

The Half-Yearly Ordinary General Meeting of the Association was held last Tuesday, at the Cannon Street Hotel, E.C.—Mr. J. Horsley Palmer in the chair.

The Secretary (Mr. R. W. Wilson) read the notice convening the meeting, and the following report of the Directors:

The Directors have pleasure in reporting on the results of the Association's operations during the half year ended Dec. 31, 1909.

The profit of the half year, together with the sum of £33,445 brought forward from the account of the previous half year, amounted to £247,298, as compared with £266,248 for the corresponding period of 1908. Although the profit of the half year is less by £18,950 than that of the corresponding period of 1908, this decrease is more apparent than real and is capable of a simple explanation. The accounts of the second half year of 1908 included the profit derived from the Association's Frankfort establishment, which, as the proprietors are aware, was last year incorporated with the Frankfort Gas Company. That Company's accounts are made up annually from April 1; and the dividend will only be declared during the current year. Consequently, comparison with the second half year of 1908 suffers by the exclusion of the yield from the Frankfort business.

Allowing for the exclusion of Frankfort from our comparisons, the results of the half year clearly indicate that the Association's business continues to develop satisfactorily. The output of gas by the Association during the half year in the various towns supplied directly by the Association amounted to 5797 million cubic feet, and showed an increase at the average rate of 5 per cent., notwithstanding an exceptionally mild and bright winter. The number of consumers on the books of the Association on Dec. 31 last was 412,789, and indicated an increase at the rate of 10 per cent. per annum. The number of meters in use at the close of the half year was: 365,537 ordinary meters, and 123,603 prepayment meters, indicating increases at the rate of 5·8 per cent. and 13·2 per cent. respectively. The total quantity of gas sold through prepayment meters represents about 11 per cent. of the total sale of gas by meter.

Sixty miles of new mains were laid during the half year under review; making the total length of mains on Dec. 31 last 2229 miles.

One of the effects of the unusual mildness of the winter was to render the disposal of coke difficult, except at considerable reductions in price; and notwithstanding a decrease of 10d. a ton in the average gross cost of coal, the net cost of coal worked out at 6s. 11·58d. per ton, or a fraction of a penny higher than in the corresponding half year of 1908. Changes in the revenue derived from tar and ammonia were unimportant; the effect of slightly lower average prices being counterbalanced by increases in the quantities produced.

The plant and mains at the stations have been, as usual, maintained in efficient condition.

Further progress was made with the erection, at the Aix-la-Chapelle station, of the new retort-house with vertical retorts.

At Antwerp, the new works at Hoboken were completed, and put in action on Oct. 12, 1909.

At Berlin, a site in the suburb of Schmargendorf was acquired for the purpose of a governor station. The steel tank for the 5½ million cubic feet gasholder at Schöneberg was completed, and progress was made with the erection of the holder itself. The erection of four purifiers on the Mariendorf works was completed. At the same works, fourteen furnaces of vertical retorts, in the house of which the completion was announced in the preceding report, were completed, and brought into action.

A contract was concluded with the Commune of Gross Lichterfelde, a suburb of Berlin, by which the Association's monopoly of the supply of gas was extended from 1939 to 1959. The Association's monopoly for the supply of gas to the Commune of Teltow—another suburb of Berlin—was prolonged from 1946 to 1956.

At Brussels, the new house of vertical retorts at the Forest works was completed, and brought into use. Good progress was made with the construction, at Droogenbosch, of the electricity station referred to in the report for the second half year of 1908. Contracts were concluded with the suburban communes of Cortenberg and Nosseghem for the exclusive right to supply gas and electricity until the year 1948.

At Flushing, the retort-house, to contain twelve regenerator settings of eight retorts each, was completed, and progress was made with the construction of the benches. The erection of the new building to contain offices and show-room was completed.

At Corbeil—one of the towns supplied by the Cie. Continentale du Gaz—a monopoly for the supply of gas in the suburban commune of St. Germain lez Corbeil until 1941 was secured; and at Thizy—another of the towns supplied by this Company—the monopoly was extended from 1922 to 1948.

In conclusion, the Directors desire to draw the attention of the proprietors to the accounts for the half year ended Dec. 31 last, and to the balance-sheet, copy of which was appended to the circular calling the meeting. These have been duly audited; and from them the Directors have, in accordance with the provisions of the Companies' Clauses Consolidation Act, prepared a scheme showing the profit of the Association for the half year, and the portion thereof applicable to the purposes of dividend, which they recommend now to be declared—viz., a dividend of 4 per cent. for the half year ended Dec. 31, 1909, payable, free of income-tax, on and after Tuesday, the 10th of May next.

The Directors who go out of office by rotation are: Sir Charles James Jessel, Bart., John Henry Birchenough, Esq., C.M.G., and Corbet Woodall, Esq. These gentlemen are eligible for re-election, and offer themselves accordingly. The Auditor who goes out of office by rotation is Theodore Bromhead Bassett, Esq., J.P., who is eligible for re-election, and offers himself accordingly.

Scheme for the Division of the Profits of the Half Year ended Dec. 31, 1909.

Dr.	Balance brought forward from last half year . .	£33,444	12 9
	Profit resulting from the workings at the stations, and dividends on investments, less interest on debenture stock, and the charges on account of depreciation and income-tax	213,853	9 1
		£247,298	1 10
Cr.	Dividend of 4 per cent. for the half year . . .	£197,600	0 0
	Credit to pension reserve	40,000	0 0
	Balance carried forward to next half year . . .	9,698	1 10
		£247,298	1 10

THE RATE OF GAS INCREASE AND OF CONSUMERS.

The Chairman, in moving the adoption of the report, said, on many occasions, he came to the proprietors' meeting charged, he might say, almost full with very important information and facts to be given to the proprietors with regard to the half year then under review. But there were occasions—the present was one—when he had really very little important information and what he should have to relate on this occasion was merely dry business detail representing the progress of the work of the Company during the half year. According to the report the business had not shown the same percentage of increase as in previous half years. This could be readily accounted for by the extraordinarily fine and mild weather which was experienced all through Germany, and he believed nearly all over the Continent, during the six months ending December last. He himself was in Berlin during October; and he did not remember, in all his numerous visits to that city, such a brilliant and delightfully warm period as existed last autumn. Of course, this naturally affected the Association in two ways. It reduced the average of their increase in the sale of gas; and it also necessarily had its effect upon the sale of coke, which he would touch upon later. With regard to the volume of business done, the proprietors might have been led to think that the Association had had to submit to a decrease; but, instead of that, it was only the average increase that had not been so great as usual—*i.e.*, 5 per cent., as mentioned in the report. To give a concrete example, he might mention the results which had been obtained in Berlin in the immediate past. In the period extending over ten years to December, 1908, the rate of increase in the output of gas was never less than 7 per cent. But the average for the ten years had been nearly 9 per cent.; while on this occasion they were only able to report an increase there of 5¼ per cent. At the same time, they were thoroughly satisfied with the progress of their work, because they did not find that the increase in the number of consumers registered in their books tended in any way to decrease. In fact, they had had a considerable increase in the number of consumers. The highest rate of increase was shown by Brussels, where it was 12⅜ per cent. At Berlin, the number of consumers increased by about 11 per cent.; at Hanover, by 10 per cent.; while both Aix-la-Chapelle and Antwerp showed an increase of slightly over 9 per cent. So far, he thought the proprietors would agree, this was a thoroughly satisfactory record, notwithstanding the bright and warm weather they had experienced.

EXTENSIONS OF PLANT—THE NEW WORKS AT ANTWERP.

With regard to the works, their engineers, who were on the spot, and able to judge well what the future was likely to bring forth, had been very insistent in their demands for further producing and storage plant. The result was the Directors had given out orders for a large gasholder of 5½ million cubic feet capacity to be erected in Berlin; and a smaller one to be built at their works at Weissensee—a suburb of Berlin. They also hoped to put up a large gasholder at Brussels in the course of next year. They had, during the year under consideration, opened the new works at Antwerp; and though he had given the proprietors in past half years full information as to the progress of these works, he thought on this occasion he might supply a little sketch of exactly what might be seen at Hoboken. The works covered an area of about 70 acres, with a long frontage to the River Scheldt. The capacity of the first section of the producing plant was equal to 2½ million cubic feet per diem; and each of the gasholders could store one whole day's make. A considerable economy was effected by erecting two gasholders at once; and the general increase of the business at Antwerp would no doubt soon necessitate the erection of the second section of the producing plant. He might add that this station was unique among their many stations, in that the whole of the power required was supplied by an electric generating station which the Association had to acquire when purchasing the site. Steamers were able to come alongside the wharves direct from England, and discharge straight into the works, where they had the most modern and economical patterns of coal conveying and handling plant.

COAL AND COKE.

He mentioned earlier in his address that they had had a very bad time with regard to the sale of coke. He remembered that a year ago he gave the proprietors the interesting information that they had made coal contracts for a year at considerably reduced prices; and he then hoped that the reduced price would put extra profits in the coffers of the Association. So far from this being the case, the great reduction in the price of coke had wiped out the whole of the extra profits they had hoped to receive. To give an instance of how the price of coke had fallen: at Berlin, it dropped no less than 3s. 3d. per 1000 kilos. as compared with 1908; and they still had a large stock there to get rid of—in fact, there were heavy stocks of coke in every important town on the Continent. But he was not particularly distressed with regard to this, because, in his long experience as a Director of the Association, extending now over 35 years, he had seen at the various stations mountains of coke which had afterwards, when the weather allowed, been disposed of profitably. Respecting the coal contracts for the coming year, they had made them at an increase of 8d. per ton over last year. They could not do better than that—in fact, he thought they had done rather better than some other companies.

MATTERS OF DOMESTIC INTEREST—LONG SERVICE.

There were one or two matters of domestic interest to which he wished to refer. During the half year under review, another member of their staff had been added to those who had completed fifty years of continuous service in the Association. That was Mr. Phillips, who was the Chief Accountant at the home office. He retired on a well-earned pension, after this long period of service. It was rather curious to note that they had now six names on the jubilee roll (if he might so call it)—three of them belonging to the engineering staff, and three to the accountants or clerical staff. So that the technical and the clerical staff shared the honours so far; but next year they hoped to have to record another jubilee honour. Mr. Salomons, their distinguished Engineer at Brussels (whom he was glad to see present in such an excellent state of health), would then complete his fifty years of service with the Association. Regarding the workmen, they had had no difficulties with them. Every now and then there had been small clouds on the horizon, which

had quickly passed away. There was really no reason why their workmen should be dissatisfied, because the Association treated them extraordinarily well, and the Directors were always ready to meet any little demand that appeared to them fair and reasonable. He mentioned, at the meeting a year ago, that many laws were under consideration on the Continent—especially in Germany and Austria—which made it absolutely imperative on employers to insure not only their workmen, but also their clerical staffs. In Austria, this law had come into force; and therefore they had had to pay larger sums for the insurance of their salaried staff there. Most drastic laws had also been passed in France and Belgium in connection with accidents to workmen—no matter whether the accidents were fairly attributable to the negligence or fault of the workmen, the employer had to pay. That was one of those things they had to provide for in the future by allocating sums to the pension fund.

INUNDATIONS IN FRANCE.

Then there was one other thing he should like to mention. He had on a previous occasion spoken about the inundations in Germany, the difficulties caused by which had been splendidly overcome by the Engineers of the works threatened by the water. But in the case of the Compagnie Continentale, M. Delebecque (who was the General Manager in France) had had to report, in connection with the inundations in that country, that at Morez the principal gas-main going over the river was destroyed by the bridge being washed away by the floods. In Corbeil—almost a suburb of Paris—the supply was entirely discontinued for no less than seventeen days. It cost a great deal to put that right. At Meaux the sale of gas was also restricted by reason of the floods. At their own offices in Paris, they were without light or heat; and the cellars were inundated, so that a Board meeting which it was intended to hold in Paris had to be postponed.

THE BALANCE-SHEET.

Coming to the balance-sheet, they were in what might be called a period of partial transition, both in regard to technical and financial matters. At the last meeting, he gave the proprietors the very fullest information with regard to the merging of the Company's business at Frankfort into that of the Frankfort Gas Company; and it was the habit of foreign industrial companies not to pay interim dividends, but to wait until a full year had elapsed, and pay only one dividend in the course of a year. The result was that this half year they had not received a penny-piece from the substantial holding—amounting to £378,000—that they had in the Frankfort Gas Company. He believed the Directors were holding a meeting very shortly, when they would decide the dividend to be paid. This was the principal reason why the balance-sheet on the present occasion showed a reduction in the amount of the profits earned by the Association. This would naturally be adjusted six months hence. Therefore he did not think any shareholder (to all of whom a report of these proceedings would be sent) need be at all unhappy with regard to the balance-sheet.

The DEPUTY-CHAIRMAN (Mr. Arthur Lucas) seconded the motion.

Mr. S. H. HARRIS asked whether the Chairman would give the proprietors some idea of the nature of the investments—whether they were mostly kindred to their own, or outside investments.

Sir JOHN RUNTZ said the proprietors had listened very attentively to the Chairman's clear and explicit statement of the Company's working during the past half year. They could not always expect the Association's business to make progress at the highest rate they had attained; and he thought the Chairman and his colleagues must welcome a quiet time occasionally. Comparing the figures of the past half year with those for the corresponding one, considerable variations in certain of the totals were noticed. The Chairman had given them some reason for these variations; the chief being in consequence of the changed circumstances at Frankfort, which was explained fully at the previous meeting. Some of the figures, however, to December last were very different from those in the corresponding account. He noticed the item of stocks was £606,086, or a reduction of £48,000. The item of loan on security of bills was £13,000; in the previous December, it was £306,526, which was indeed a large reduction. Then freehold property in London and abroad (£236,277) had increased by £54,000. Investments in English, Colonial, and Indian securities (£416,740) had increased by £149,000. Investments and loans abroad (£2,079,767) had advanced by £523,000. These were large figures; and he took it the considerable investments and variations in totals were in great measure due to the change at Frankfort. The proprietors would like some information as to the reason for the increase of £523,000 in the investments and loans abroad. They knew it was all right; but such large figures meant interesting details. The increase in the English securities (£149,000) was also a considerable difference. He ventured to hope the Directors had not put much in Consols, because they knew what a variable quantity that was with regard to price. It was suggested on a former occasion that the Directors should invest considerably in Colonial stocks in order to avoid the violent fluctuations in Consols. The Association was a concern of great promise. The Chairman had referred to the longevity of some of their employees; and that he himself had served on the Board for 35 years. And looking round the room, he (Sir John) saw the faces of proprietors who had been there for very many years; and so it seemed the Imperial Continental Gas Association was a centre of longevity. He sincerely hoped the Chairman would add many more years' service to the 35 years already recorded; and continue to give them the clear business statements to which they had become accustomed half year by half year.

The CHAIRMAN said it seemed to him that the two proprietors who had asked for information had put their fingers on the same item—that was the investments and loans abroad, £2,079,767. He had explained from time to time how this amount had gradually grown. It had been the result of the policy the Company had been obliged to adopt of converting some of the principal stations into foreign companies. It was, as the proprietors must be aware, increasingly difficult for an English Company under an English name to work abroad. They must move with the times. They must convert their businesses into foreign companies in the countries in which they were situated, and very often give the foreigner an interest in the business to enable the work to be carried on. As a result, investments and loans abroad had increased by over £500,000—owing to the transfer from the Imperial Continental Gas Association of their Frankfort undertaking to the Frankfort Gas Company, in which they were the predominant partner. They held 58 per cent. of the whole of the capital of the Company; and therefore they had the predominant right of saying how the business should be worked. And so long as it was in the hands of the gentlemen who had been elected on the Board, of the Chairman (Mr. Delbrück), and of the Managers (in whom they had every confidence), he did not think any great risk had been run in putting the amount to investments and loans abroad. There were other companies in which they had from time to time acquired large interests for the purpose of control, and for such a purpose as not allowing them to interfere or encroach on the Association's business, and so on. All this was included in investments and loans abroad; and conduced to the good of the Association. He had a list of these investments. The principal ones were the Wazemmes Gas Company at Lille, the Compagnie Continentale, the Central (Hungarian) Company (of which he gave full particulars on the last occasion), the Oberspree Gas Company (which was really part of their business in Berlin), the Lille Electric Light Company, and many others. This, he thought, satisfactorily answered the inquiry as to the £2,079,767. Sir John Runtz had made some remarks upon investments in Consols and Colonial securities. The only Consols the Association held were those put into the reserve fund a few years after he (the Chairman) became a Director; and the amount was mentioned in a foot-note to the balance-sheet. It said: "In addition to the above, the Association possesses £400,000 2½ per cent. Consolidated Stock as a reserve fund." Other investments were in Colonial and Indian securities, a few gas companies' shares, and so on. These the Directors considered good and satisfactory holdings, and he believed they would, if sold, secure something more than the amounts appearing in the balance-sheet.

The motion was unanimously carried.

The CHAIRMAN moved the declaration of a dividend of 4 per cent. on the £4,940,000 capital stock, for the half year, free of income-tax.

Sir CHARLES J. JESSEL, Bart., in seconding, said, as he knew the Chairman would like to be quit of any inaccuracy, he might say that, besides the amount of Consols comprised in the reserve fund, they had a sum of £80,000 of stock, which was the residue of the £100,000 stock in which they invested on the realization of the Amsterdam assets many years ago. This £80,000 was now valued at 82; and therefore stood in their books at £65,600.

The motion was adopted.

The CHAIRMAN thanked Sir Charles Jessel for his correction; and he then moved his re-election as a Director.

The DEPUTY-CHAIRMAN seconded the motion, which was agreed to.

Proposed by the CHAIRMAN, and seconded respectively by Sir E. CHANDOS LEIGH and Mr. ROBERT TINDALL, Mr. J. H. Birchenough, C.M.G., and Mr. Corbet Woodall were also re-elected to their seats at the Board.

The retiring Auditor (Mr. T. Bromhead Bassett, J.P.) was re-appointed, on the proposition of Mr. DENDY MARSHALL, seconded by Sir JOHN RUNTZ.

On the motion of the CHAIRMAN, seconded by Colonel MITCHELL, a hearty vote of thanks was passed to the officers and staffs at home and abroad—their excellent services being duly commented upon by the Chairman.

Mr. WILSON having responded on behalf of himself and his colleagues,

The Chairman and Directors were also thanked for their services, on the motion of Sir JOHN RUNTZ, seconded by Mr. J. GURNEY FOX.

This concluded the proceedings.

SOUTHAMPTON GASLIGHT COMPANY.

The Half-Yearly Meeting of the Company was held at the Offices, Ogle Road, Southampton, last Wednesday—Captain A. J. CORSE SCOTT, J.P., presiding.

The CHAIRMAN, in moving the adoption of the report and accounts, said the latter for the past half year showed that the Company were still progressing, and the maximum dividends could again be paid. Notwithstanding the mildness of the weather, compared with the corresponding period of the previous year, more gas had been sold. In October last, the Directors decided to let out on hire a large variety of gas-fires. These were greatly appreciated by consumers; upwards of 788 being hired in the last three months of the year. The cleaning and adjusting of consumers' burners by the Company's servants had also given satisfaction; and the number of consumers who availed themselves of the offer steadily increased. The Directors had now decided to fix gas-cookers free of charge to approved consumers; and they hoped this would lead to a large increase in their use. There was little doubt that a consumer having once experienced the advantages which a gas-cooker offered, would be very loth to revert to the old form of cooking by a coal-range. At the last meeting of stockholders, mention was made that the Corporation had decided to light a large number of the street-lamps by electricity instead of gas; and this notwithstanding that in other parts of the kingdom the practice was to light by gas. Recently the important district of Westminster decided to light all their streets by gas. It might be of interest to stockholders who were also ratepayers of Southampton to point out the expense to which the town was being put in carrying out the alterations. The cost to the town when a lamp was erected and supplied with gas was (apart from the lamp-column), on an average, £1 9s. 6d. per lamp. The removal of gas service and fittings cost 6s. 6d.; and the installation of electric cable and fittings, according to figures supplied to the Council by the Chairman of the Electricity Committee, averaged £2 15s. 5d. per lamp. Thus for every lamp where electric light was installed in place of gas, the town paid £4 11s. 5d. Upwards of 500 had already been so fitted at a total cost of over £2200. In addition to this, there was no saving to the town in the cost of lighting. The light of the electric lamps was supposed to be greater than that of the gas-lamps. This was a point which was open to question; and it would not be shown that the town

was receiving any monetary benefit. The Directors complained that no opportunity was given by the Corporation to the Company to show what could be done by the latest form of gas lighting, nor had any complaint been made that the lighting of the streets had not been carried out as required. If the opportunity had been offered, the Directors were prepared to show that gas could maintain its position as the best and cheapest form of artificial lighting. The outside of the Company's offices was now lighted by a system of high-pressure gas, and the important railway station at Brighton had had this system recently installed in place of electric light. In view of the continued growth of the Company's business, £10,000 of ordinary stock of the Company was offered for sale by tender at £112 per £100 of stock. The Directors anticipated that the stock would, as before, be readily subscribed for.

The motion was carried unanimously, as was also the resolution for the declaration of the maximum dividends.

Thanks were accorded to the Chairman and Directors and acknowledged by the CHAIRMAN, who proposed a vote of thanks to the Secretary, the Resident Manager, Consulting Engineer, and the staff.

Mr. J. R. H. JACOBS (the Secretary), Mr. F. DURKIN (the Deputy-Resident Manager), and Mr. JOSEPH CASH (the Consulting Engineer) returned thanks; the latter remarking that the works were in a very good condition.

WELSBACH INCANDESCENT GASLIGHT COMPANY.

Further Reduction in Profits—Proposed Scheme of Reconstruction.

In the report of the Directors of the above-named Company for the year ended the 31st of March last, to be submitted at the meeting of shareholders to-day, they state that the net profit of the whole undertaking, including the dividend for the year 1908-9 upon the Company's holding in the Austrian Company, amounts to £18,590. To this must be added £5373 brought from the previous year; making £23,963 in all. After deducting the dividend for the half year upon the 6 per cent. preference shares, which was paid on the 1st of January, there remains to be dealt with £5966. The Board recommend that this sum should be carried forward.

The Directors express regret that the continued trade depression has again prejudicially affected the Company's sales, and that the net profit for the year shows a decrease. The year under review has borne the cost of special propaganda in connection with the launching upon the market of the new electrical section of the Company's business, as to which it should be remarked that no capital expenditure has been incurred. The Board also regret that the result of the past year's trading does not allow of any further distribution to the shareholders. As regards the ordinary shares, it is impossible, in view of existing conditions, to hold out any hope of dividends. After an exhaustive review of the position and prospects of the whole undertaking, and after conference with a number of the largest holders of preference and of ordinary shares, the Board are of opinion that the time has arrived when the final reorganization of the capital of the Company should be undertaken.

The accounts of the Austrian Company for the year ended March 31, 1910, have not yet been finally audited; but it is understood that the dividend to be declared shortly (and which, when received, will be brought into next year's accounts of the Company) will be at the same rate as the previous year.

Accompanying the report is a circular dealing with the proposed reorganization of the capital. The Directors recommend that this should be written-down by a sum of £843,000 (being the aggregate of £70,000, the value of patents of which the chief have expired, and £773,000 lost or unrepresented by available assets); the new capital thus standing at a sum not exceeding £500,000. The Directors express the hope that the course of trade may render it possible to earn regular dividends on the reduced capital, and at the same time make provision for consolidating and strengthening the Company's future position. The Board propose to convert both classes of shares into common stock on the basis of 15s. for each of the 600,000 £1 preference shares, making £450,000, corresponding approximately to the estimated amount of the tangible assets; and at the rate of 1s. 4d. each for the 743,975 £1 ordinary shares, about £50,000, representing approximately the figure at which the remaining assets, such as goodwill, patents, and trade marks will stand when written-down.

Veteran Gas Official's Retirement.

At the monthly meeting of the Bolton Town Council last Wednesday, reference was made by several members to the retirement (intimated in the "JOURNAL" for the 3rd inst.) of Mr. William Walch, the Office Superintendent of the Gas Department. Mr. Webster, the Chairman of the Gas Committee, said Mr. Walch was an old and valued official of the Corporation, and well known and respected by everyone connected with the gas undertaking. He was resigning after very many years' faithful service, and was deserving of all the praise that could be showered upon him. Mr. Walch was associated with the old Bolton Gas Company for 14 years; and when the Corporation took over the works in 1872, he entered their service, and had continued without a break for 38 years—making his service with the undertaking well over the half-century. He hoped Mr. Walch would live long to enjoy in comfort and pleasure his well-earned retirement. Alderman Miles, a Past-Chairman of the Gas Committee, also paid a warm tribute to the manner in which Mr. Walch had carried out the duties of his office.

A Decreased Sale at West Bromwich.—The Gas Committee reported to the West Bromwich Town Council that the sales of gas for the financial year ending March 31 amounted to 321,506,608 cubic feet—a decrease of 7,838,780 cubic feet. The amount of gas-rental was £38,908—a decrease of £1166. Alderman Wilson, the Chairman of the Committee, drew attention to the decrease in the consumption, and said it was a very sorry state of things; but they had made certain economies at the works, and had every reason to believe that they would next year come out better than last.

BELFAST CORPORATION GAS SUPPLY.

The Proposed Auxiliary Gas-Works—Public Lighting.

At the Meeting of the Belfast County Borough Council on Monday last week, the above-named subjects were under consideration on the presentation of the minutes of the Gas Committee, which contained a recommendation that an engineering assistant should be appointed to prepare the necessary plans and estimates in connection with the proposed auxiliary gas-works, the appointment to be left with the Manager. Details were given as to the negotiations which had been in progress with the Harbour Commissioners for the acquisition of the Twin Island site for the new works.

Mr. J. A. DORAN, in moving the adoption of the minutes, said that, as Chairman of the Gas Committee, he was trying to look after the gas-works to the best of his ability, and prevent the squandering of money. The public were continually urging as a reason for not having the auxiliary works that the age of electricity was coming in; and to this he replied by saying that the age of gas was also coming in, for it was as yet only in its infancy. He felt very much obliged to Mr. Riddell for the report made with reference to a recent visit to London. In the course of his observations, he mentioned that he "inspected the electric street lighting, and was of opinion that the most brilliantly lighted streets were Regent Street and Oxford Circus; that at a recent meeting of the Westminster City Council, which was held to determine the lighting contracts for the next five years, it was decided by a very large majority to abandon electricity for street lighting purposes in this district, and to substitute gas, on the ground that the same light can be got at two-thirds of the cost." The Council should mark the words of Mr. Riddell's report—"two-thirds of the cost." This showed them what London was doing with regard to gas; and instead of appointing a deputation to go there, they should accept the figures given in the report referred to. What were they going to do now? He heard that they were going to make another experiment, and were going to introduce electric light in High Street and Donegall Place. They should ask the Chairman of the Police Committee to take the advice given them by the Westminster City Council, as conveyed to them by Mr. Riddell, and see if it were not wiser for him to stay his hand for the present.

Mr. RIDDELL said he was a friend of both Committees. A penny per unit was an impossible price to charge for electric current, because the cost to the Corporation was 1·86d. He had no objection to the difference being presented to the city; but it was well that members of the Corporation and the citizens should know what was being done.

Dr. WILLIAMSON said he was not prepared to accept Mr. Riddell's figures with regard to the cost of electricity. He held that the councillor had no right to spring the matter on the Gas Committee without first bringing it before the Police Committee. The question of lighting the city by electricity had never had fair consideration; and the conditions which existed in London and Belfast were not identical.

Mr. CURLEY mentioned, in regard to a letter written by him asking for a copy of Messrs. Hunt, Herring, M'Laughlin, and Stewart's estimates for the gas-works extension at the Twin Island site, that he had received no reply. He wanted to see the papers in connection with the borings; and he moved, as an amendment—"That all reference to the gas-works extension on the Twin Island site be eliminated from the minutes."

The amendment was not seconded.

Mr. DORAN said the Committee would be happy to give Mr. Curley every document in their possession.

The TOWN CLERK (Mr. R. Meyer) read the resolution passed in March regarding the Twin Island site, and said it authorized the Gas and Law Committees to take the necessary steps to acquire the land. They were now doing so.

Mr. DONNELLY thought every member of the Corporation should have a copy of the documents referred to by Mr. Curley. He said there were people who believed that the works to be established at the Twin Island site would really be the gas-works of the city of Belfast in a very short time, and there was natural anxiety to know if the whole question was not to come up again before the Corporation.

Mr. DORAN said what they were going to do was to put up works equal to the production of 5 million cubic feet of gas per day; and they would go on extending as their requirements increased. They would not expend any more money on the old works; and eventually all the output would be from the Twin Island works. As opportunity served, they would do away entirely with the Ormeau Road site. They had 13½ acres of very valuable land there; and, no matter where they built, the ratepayers would, with economical management, not lose a shilling.

The minutes were then adopted.

ROCHDALE AND ITS RATES.

Protest against Further Filching of Gas Profits.

The Rochdale Town Council adopted, at their Meeting last Thursday, the report and estimates of the Finance Committee for the current year. By further "milking" the gas and electricity profits, coupled with a cutting-down in the estimates, the borough rates are kept down to last year's level—namely, 7s. 9d. in the pound.

When the amount for the General Purposes Rate came up for consideration, Mr. Sharp protested against £9000 being taken from the gas profits in aid of the rates, and moved, as an amendment, that the sum be £8000, as decided upon by the Gas Committee. In seconding, Mr. Thomas maintained that it was bad management on the part of the Council to continually take these large sums from gas profits, when they were required to build up the reserve fund to pay for the new retort-house. The building of the retort-house had been delayed by this policy of taking so largely from profits. Mr. Ogden observed that the gas-works were extremely well administered; but the Council had, in

his opinion, managed things badly in seizing so much of the profit. He pointed out that in the last fifteen years the Gas Department had contributed over £170,000 for the relief of the rates. Mr. Blomley contended that the principle was wrong of making large profits out of the gas consumer, and applying them to reduce the rates of other people who did not use gas in their houses, mills, or workshops.

By a large majority, the amendment was defeated. Therefore the Gas Committee must contribute £9000, instead of £8000 as originally proposed.

ROTHERHAM GAS DEPARTMENT.

Referring to the business of the Gas Department, at the quarterly meeting of the Rotherham Borough Council, Alderman Gummer, the Chairman of the Gas Committee, pointed out that there had been a decrease in the sale of gas in the past year of 4,383,000 cubic feet. The explanation was partly bad trade; and the falling off was particularly owing to one or two large works, which used to run all night, having only day-shifts. On the other hand, while the gas had decreased in sale for manufacturing purposes, household consumers had taken 2,500,000 cubic feet more. This had passed through prepayment meters. Some £15,145 had been collected from automatic meters—meaning that the inspectors had carried 34 tons of copper. Leakage had increased to 9 per cent., as against 8·81 per cent. last year. The gas made per ton of coal carbonized was 12,404 cubic feet, compared with 12,345 feet—an increase of 59 cubic feet. This constituted a further record for the department. It was the highest make of gas per ton of coal of any gas department in the country where they made coal gas alone. He thought it reflected the very highest credit upon the officials, and showed the coal that had been purchased by the Committee to be of very good quality. The gross profit was £15,493; and this would help to give them some idea as to whether the gas-works were doing fairly well. It represented 10¼ per cent. on the present net debt, which was £146,826; and it represented, if they took the whole of the capital that had been paid on the works, 7⅛ per cent. Dealing with the amount contributed in relief of the rates by the Gas Department since the Corporation had owned the gas-works, he said the total was £109,000. If the works had been carried on as a private undertaking, the shareholders would not only have had reasonable interest for the money invested, but the whole of the capital would have been paid off. If the Rotherham Corporation had done the latter, instead of relieving the rates, they would in all probability have been able to distribute gas as cheaply as any works in the country. They had robbed the gas consumer in order to keep down the rates. By taking out £6000 for the rates this year, the department would have a deficit at the bank upon which interest would have to be paid. This was not dealing fairly with the department.

The Gas Engineer (Mr. J. S. Naylor), in his report for the year, stated that the amount of gross profit made was £15,493, as against £14,768; being an increase of £725. The net profit, after allowing for interest, redemption instalments, and sinking fund, amounted to £6136, as against £5395 last year—an increase of £741. If the gas for public lighting—£2492—was again given by the department, as in former years, there would remain an available surplus profit of £3644, as against £2981 last year.

DUKINFIELD GAS DEPARTMENT.

The Past Year's Working.

The Manager of the Dukinfield Corporation Gas Department (Mr. William Lindley) reports that the carbonizing plant again worked satisfactorily during the past financial year; but, owing to depression in trade, there was a decrease in the make of gas. The total quantity of gas accounted for was 78,834,300 cubic feet, apportioned as follows: Cottages, by ordinary meters, 39,785,800 cubic feet; do., slot-meter consumers, 10,532,100 cubic feet; mills, 21,301,238 cubic feet; public lamps, 6,132,825 cubic feet; offices, works, &c., 1,082,337 cubic feet. The total revenue for the year was £12,672 (£9809 being for gas), and the expenditure £9075 (£4797 being for coal); leaving a gross profit of £3597. Adding £34 received as cottage rents, a total of £3631 was produced. Of this sum, £3154 was required for annuities, interest, and sinking fund; leaving a net profit of £477, compared with a profit of £868 for the year 1908-9, and of £552 for 1907-8. According to a table, which has been verified by Mr. William Moss, of Ashton-under-Lyne, showing the cost of gas per 1000 cubic feet sold for the past and the preceding financial years, the total cost of production in the former was 2s. 4·41d., and in the latter 2s. 6·04d.; the average prices being 2s. 5·86d. and 2s. 8·63d. There was consequently a gain of 1·45d. in 1909-10, compared with 2·59d. in the preceding year and 1·55d. in 1907-8. Mr. Lindley is to be again congratulated on the results of his year's work. The quantity of coal and cannel carbonized in the twelve months was 7389 tons; and the total make of gas was 85,471,000 cubic feet. As the quantity sold was 78,834,300 cubic feet, the unaccounted-for gas was 6,636,700 cubic feet, or 7·76 per cent. The make and sale per ton of coal were 11,567 and 10,669 cubic feet respectively, compared with 11,817 and 10,937 cubic feet in the preceding year.

Leeds and Vertical Retorts.—At last week's meeting of the Leeds City Council, Mr. Brassington moved, and Mr. W. Wood seconded, to refer back a proposal to send a deputation to London to visit an installation of vertical retorts. Mr. Badley contended that at the Leeds Gas-Works machinery had been scrapped, and new appliances had been adopted to save labour; but on account of the piling-up of interest and sinking-fund charges, the expenses of the works had been actually increased. Mr. R. Armitage, M.P., said that money would be well spent if the whole of the Council were taken to see vertical retorts in operation and taught to appreciate the advantages to be derived by employing them. The amendment was defeated, and the minutes were approved.

GAS COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 363.

Issue	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
1,474,000	Stk.	Apl 1	5	Alliance & Dublin Ord.	82–84	..	5 19 1
310,000	Stk.	Jan. 13	4	Do. 4 p.c. Deb.	100–102	..	3 18 5
200,000	5	Oct. 28	7†	Bombay, Ltd.	6⅜–6⅝	..	5 5 8
40,000	5	,,	7†	Do. New, £4 paid	5–5⅛	..	5 6 8
50,000	10	Feb. 25	15	Bourne-mouth Gas and Water Pref. 6 p.c.	29–30	..	5 0 0
311,810	10	,,	7		16½–16⅝	..	4 3 7
75,000	10	,,	6		15–15⅛	..	3 17 5
380,000	Stk.	,,	12½	Brentford Consolidated	251–254	..	4 18 5
300,000	,,	,,	9⅜	Do. New	183–191	..	5 0 0
50,000	,,	Aug. 12	5	Do. 5 p.c. Pref.	120–122	..	4 2 0
206,250	,,	Dec. 29	4	Do. 4 p.c. Deb.	101–103	..	4 17 8
220,000	Stk.	Mar. 16	11	Brighton & Hove Orig.	213–216	..	5 1 0
246,320	,,	,,	8	Do. A Ord. Stk.	152–155	..	5 3 3
460,000	20	Apl. 1	10⅝	British	44–45	..	4 14 8
109,000	Stk.	Feb. 25	6	Bromley, A 5 p.c.	118–120	..	5 0 0
165,700	,,	,,	4½	Do. B 3½ p.c.	88–90	..	5 0 0
82,278	,,	,,	5⅜	Do. C 5 p.c.	105–107	..	5 2 10
51,000	,,	Dec. 29	3½	Do. 3½ p.c. Deb.	87–89	..	3 18 8
500,000	10	Oct. 14	7	Buenos Ayres (New) Ltd.	—	..	—
250,000	Stk.	Dec. 29	4	Do. 4 p.c. Deb.	98–100	..	4 0 0
100,000	10	—	—	Cape Town & Dis., Ltd.	4–5	..	—
100,000	10	—	—	Do. 4½ p.c. Pref.	6–7	..	—
50,000	50	May 3	6	Do. 6 p.c. 1st Mort.	48½–49½	..	6 1 3
100,000	Stk.	Dec. 29	4½	Do. 4½ p.c. Deb. Stk.	86–88	..	5 2 3
157,150	Stk.	Feb. 25	5	Chester 5 p.c. Ord.	109–111	..	4 10 1
1,513,280	Stk.	Feb. 25	5⅝	Commercial 4 p.c. Stk.	106–108	..	4 16 4
560,000	,,	,,	—	Do. 3½ p.c. do.	103–105	..	4 15 3
475,000	,,	Dec. 29	3	Do. 3 p.c. Deb. Stk.	81–83	..	3 12 3
800 000	Stk.	Dec. 10	5	Continental Union, Ltd.	98–100	..	5 0 0
200,000	,,	,,	7	Do. 7 p.c. Pref.	138–140	..	5 0 0
492,270	Stk.	,,	5⅜	Derby Con. Stk.	121–123	..	4 9 5
55,000	,,	—	4	Do. Deb. Stk.	101–105	..	3 16 2
148,995	,,	Apl. 1	5	East Hull 5 p.c. Ord.	96–98	..	5 2 0
486,090	10	Jan. 27	12	European, Ltd.	24½–24⅝	..	4 17 0
354,060	10	,,	12	Do. £7 10s. paid.	18½–18⅝	..	4 16 0
16,198,671	Stk.	Feb. 10	4⅜	Gas light and Coke	103½–104½	..	4 9 3
2,600,000	,,	,,	3⅜		88–90	..	3 17 9
4,002,235	,,	,,	4		104–106	..	3 15 6
1,531,706	,,	Dec. 29	3		81–83	..	3 12 3
258,740	Stk.	Mar. 16	5	Hastings & St. L. 3½ p.c.	93–95	..	5 5 3
82,500	,,	,,	6¾	Do. do. 5 p.c.	117–119	..	5 9 3
70,000	10	Apl. 29	11	Hongkong & China, Ltd.	17–17⅛*	..	6 5 9
131,030	Stk.	Mar. 16	7	Ilford A and C	145–147	..	4 15 3
65,780	,,	,,	5⅜	Do. B	105–110	..	5 0 0
65,500	,,	Dec. 29	4	Do. 4 p.c. Deb.	100–102	..	3 18 5
4,940,000	Stk.	Nov. 11	8	Imperial Continental	181–183	..	4 7 5
1,235,000	Stk.	Feb 10	3⅜	Do. 3½ p.c. Deb. Red.	94–96	..	3 12 11
195,242	Stk.	Mar. 16	6	Lea Bridge Ord. 5 p.c.	122–124	..	4 16 9
561,000	Stk.	Feb. 25	10	Liverpool United A	222–224	..	4 9 3
718,100	,,	,,	7	Do. B	163¼–165½	..	4 4 7
306,083	,,	Dec. 29	4	Do. Deb. Stk.	103–105	..	3 16 2
75,000	5	Nov. 26	6	Malta & Mediterranean.	4⅛–5	..	6 0 0
560,000	100	Apl. 1	5	Met. of 5 p.c. Deb.	100–102	..	4 18 0
250,000	100	,,	4½	Melbourne 4½ p.c. Deb.	100–102	..	4 8 3
541,920	20	Nov. 11	3⅜	Monte Video, Ltd.	12⅞–13⅛	..	5 5 8
1,775,892	Stk.	Feb. 25	4⅜	Newc'tle & G'tesh'd Con	104–106	..	4 2 7
529,435	Stk.	Dec. 29	3⅜	Do. 3½ p.c. Deb.	91–93	..	3 15 3
55,940	10	Feb. 25	7	North Middlesex 7 p.c.	133–133⅜	..	5 1 10
300,000	Stk.	Apl. 29	8	Oriental, Ltd.	138–140*	..	5 14 4
60,000	5	Apl. 1	8	Ottoman, Ltd.	6–6⅛	..	6 8 0
31,800	53	Feb. 25	13	Portsea Island A.	134–136	..	5 1 0
60,000	50	,,	13	Do. B.	126–128	..	5 1 7
100,000	50	,,	12	Do. C.	119–121	..	4 19 2
114,800	50	,,	10	Do. D and E.	100–102	..	4 18 0
398,490	5	Apl. 29	7	Primitiva Ord.	7⅛–7⅜*	..	4 10 4
796,980	5	Jan. 27	5	Do. 5 p.c. Pref.	5⅛–5⅜*	..	4 9 11
488,903	100	Dec. 1	4	Do. 4 p.c. Deb.	99–101	..	3 19 3
1,000,000	10	Oct 14	8	River Plate Ord.	—	..	—
312,650	Stk.	Dec. 29	4	Do. 4 p.c. Deb.	99–101	..	3 19 3
250,000	10	Apl. 1	9	San Paulo, Ltd.	15⅛–15⅜	..	5 14 3
62,500	10	,,	6	Do. 6 p.c. Pref.	11⅞–12⅛	..	4 18 0
125,000	50	Jan. 3	5	Do. 5 p.c. Deb.	5 ⅛–5⅛	..	4 17 1
135,000	Stk.	Mch. 16	10	Sheffield A	232–234	..	4 5 5
209,984	,,	,,	10	Do. B	232–234	..	4 5 5
523,500	,,	,,	10	Do. C	232–234	..	4 5 5
700,000	10	Oct. 14	10	South African	12⅛–12¾	..	7 16 11
6,429,895	Stk.	Feb. 10	5/9/4	South Met., 4 p.c. Ord.	120–122	..	4 9 7
1,895,445	,,	Jan. 13	3	Do. 3 p.c. Deb.	81–83	..	3 12 3
209,820	Stk.	Mar. 16	8	South Shields Con. Stk.	157–158	..	5 1 3
605,000	Stk.	Feb. 25	5⅜	S'th Suburb'n Ord. 5 p.c.	121–123	..	4 12 0
60,000	,,	,,	5	Do. 5 p.c. Pref.	121–123	..	4 1 4
117,058	,,	Jan. 13	5	Do. 5 p.c. Deb. Stk.	122–124	..	4 0 8
502,310	Stk.	Nov. 11	5	Southampton Ord.	110–112	..	4 9 3
120,000	Stk.	Feb. 10	6¾	Tottenham A 5 p.c.	133–135	..	5 1 9
453,940	,,	,,	5⅜	and B 3½ p.c.	113–115	..	4 13 6
149,470	,,	Dec. 29	4	Edmonton 4 p.c. Deb.	99–101	..	3 19 3
182,380	10	Dec. 29	8	Tuscan, Ltd.	9¼–9⅜	..	8 4 2
149,900	10	Jan. 3	5	Do. 5 p.c. Deb. Red.	99–101	..	4 19 0
230,476	Stk.	Feb. 25	5	Tynemouth, 5 p c max.	113–115	..	4 0 11
255,636	Stk.	Feb. 25	6⅜	Wandsworth B 3½ p.c.	139–141	..	4 14 0
79,416	,,	Dec. 29	3	Do. 3 p.c. Deb. Stk.	74–76	..	3 18 11

Prices marked * are "Ex div." † Next dividend will be at this rate.

GAS COMPANIES (STANDARD BURNER) BILLS.

Withdrawal of Opposition at Tunbridge Wells.

At the Meeting of the Tunbridge Wells Town Council last Wednesday, the Lighting Committee reported that a conference of local authorities had been held at the Westminster Palace Hotel, to consider the further action to be taken by way of opposing the Gas Companies (Standard Burner) Bills in the House of Commons; and that a resolution had been passed recommending that the opposition should be continued. The proportion of cost payable by the Tunbridge Wells Corporation in opposing the Gas Companies (Standard Burner) No. 2 Bill in the House of Lords was about £100; and the Committee recommended that the opposition should not be continued in the House of Commons. On the motion for the adoption of the report, Mr. Hyde asked how many of the authorities with whom they joined had decided to continue the opposition, how many had come to terms with the local gas companies in arranging for a reduction in price or in other respects, and what special circumstances there were with regard to Tunbridge Wells which made it desirable that the opposition should not be continued, having regard to the fact that the Gas Company had not revised their terms. Mr. Tylor said a considerable proportion of the authorities were remaining in to oppose the three Bills. Several had dropped out—in one or two cases because certain arrangements had been made with them by the gas companies in the district for a reduction in price. The Committee thought it would put the town to a great expense to continue the opposition, and that as it had failed in the House of Lords it would probably also do so in the House of Commons; but, of course, nobody could predict this with certainty. The Gas Company had not made any overtures to the Committee. In view of the fact that the town possessed an electricity undertaking, it was doubtful whether the Company would take advantage of the Act when they got it; but if they reduced the quality of their gas for lighting and heating purposes, it would very much assist the undertaking of the Corporation in more ways than one. Mr. Hyde said the object of the Corporation should be to see that the gas, as an illuminant and as a heating agent, should be up to the comparatively low standard provided for by the local Act of Parliament, which was 15 candles. He moved, as an amendment, that the Town Clerk be instructed to take the necessary steps to present a petition against the Bill. Mr. Emson seconded the amendment. Alderman Delves (the Chairman of the Gas Company) asked permission to address the Council on this matter. He pointed out that a reduction of 2 candles in illuminating power would mean a decrease of only about 2 per cent. in the calorific power of the gas; and no one, he said, would be able to distinguish this. He claimed, and with reason, that the Gas Company had considered the poor people as much as anyone in the Council. There were 1500 incandescent gas-burners used by them; and arrangements had been made to supply burners to those people who consumed a certain amount of gas. Mr. Berwick remarked that it was probable that some of the authorities who had withdrawn their opposition had done so because they had come to arrangements with the local gas company; but in Tunbridge Wells nothing of the sort had happened. Mr. Elwig said he believed that several of them had not made any terms at all. He thought the Gas Company had met the town fairly, and had treated their consumers very well. After further remarks, the amendment was lost. Opposition by the Council will consequently be withdrawn.

THE INQUIRY AS TO PORT OF LONDON RATES.

Lord St. Aldwyn's Report.

It will be remembered that an inquiry was recently held by Viscount St. Aldwyn with respect to the schedule of maximum port rates on goods submitted to the Board of Trade by the Port of London Authority and the Draft Provisional Order embodying the schedule. A very large number of objections to the latter were sent in; among them being those by the Gaslight and Coke, South Metropolitan, Brentford, Commercial, and Wandsworth and Putney Gas Companies. The list of objectors also included the Anglo-American Oil Company, Limited; the Bargeowners' and Lightermen's Defence League; the British Alizarine Company, Limited; the British Petroleum Company, Limited; Messrs. Burt, Boulton, and Haywood, Limited; the London Chamber of Commerce (Cement and Oil Trades Sections); and the London Waterside Manufacturers' Association. Many of the objectors were represented or appeared at the inquiry, which was held towards the close of February and for a number of days in March; and the proceedings, so far as they related to the Gas Companies named, were reported in the "JOURNAL" at the time. Lord St. Aldwyn has made his report; and the following are some extracts from it.

The inquiry commenced with a statement from the Port Authority of the procedure adopted by them in framing a schedule of maximum rates. It appeared that this was prepared in the summer of 1909, and circulated among the leading trading associations and firms in London with a request for their observations. From more than 200 of these bodies criticisms and objections relating to about 45 per cent. of the articles named in the schedule were received; and 16 deputations from the most important objectors laid their views before the Port Authority. In the case of about 45 per cent. of the rates objected to, the schedule was modified before being submitted to the Board of Trade. The schedule thus modified was estimated to produce about £550,000 a year from maximum rates on oversea imports, and £200,000 from maximum rates on oversea exports; but there are no trustworthy statistics available as to the probable yield of rates on coastwise traffic, except that 1d. per ton on coal is estimated to yield from £33,000 to £35,000. The deductions which it may be necessary to make from these figures on account of the statutory exemption of transhipment traffic, or the exemptions or rebates which the Port Authority may find it necessary to make in any special cases, can only be arrived at by experience in

working. In addition to these, it appeared, from statements made by the Port Authority in the course of the inquiry, that the rates actually charged would not, generally speaking, exceed half the maximum rates. After making all reasonable deductions on these grounds and on others which will be subsequently mentioned, I was satisfied that the maximum rates submitted to the Board of Trade were in very many cases unnecessarily high; and large reductions were made in the schedule settled at the inquiry as compared with that submitted to the Board of Trade.

Many of the objectors showed a want of confidence in the future action of the Port Authority in dealing with the matters in which they were specially concerned, which certainly gave no sufficient weight to the care taken by Parliament in constituting the Authority so as fairly to represent the varied interests of the Port, or to the difference between the position of such an authority and that of the directors of (say) a railway company. Putting aside any question of the action of the Port Authority in matters connected with their dock or warehousing business, which is dealt with by section 27 of the Port of London Act, the sole interest of the Port Authority is to maintain and increase the trade of the Port. They have no shareholders to satisfy; and therefore I considered that, however proper or necessary the interference of the Board of Trade may be between a railway company and the public or the traders, there could be no justification for making the Board a Court of Appeal against the rates actually charged or other administrative action by the Port Authority. But in view of the strong desire for some protection in the Provisional Order, especially on the part of the waterside manufacturers and those concerned in the re-export business, I have thought it advisable to insert clause 5 as a general direction that the Port Authority should endeavour, so far as they consider practicable, so to adjust the rates actually charged and the exemptions and rebates as to ensure that (1) the import rates on the materials used in the manufacture of any article shall not be more than the import rates on a like manufactured article imported from parts beyond the seas; and that (2) the port rates actually charged on goods exported to parts beyond the seas shall not exceed one-half of the port rates for the time being actually charged on similar goods imported from parts beyond the seas. The words are so framed as to leave it open to the Port Authority, in exceptional cases, to prevent any administrative difficulty or injury to some other interest that might result from a universal application of the rule.

In dealing with the objections, I held that Parliament had laid down the general principle that import and export rates should be levied on coastwise and oversea goods, and that the levy should be commenced as soon as it could be legalized; and therefore I declined to entertain objections to the enactment of any port rates, or of any export or any coastwise rates, or proposals that the levy should be delayed until part, at any rate, of the contemplated improvements had been undertaken. The questions to be discussed were, as far as possible, grouped under the following heads: (1) Definition of Transhipment. (2) Rates on Coastwise Goods. (3) Rates or Rebates on Exports and Re-Exports. (4) Rates or Rebates on Raw Materials. (5) Rates on the River Trade. (6) Miscellaneous, including Short Sea Trade. (7) Rates on Particular Articles, commencing with Coal. (8) System of Collection.

The important points raised on each subject, with a brief statement of the arguments and the conclusions at which Lord St. Aldwyn arrived, are summarized under the several heads. In the course of his Lordship's remarks on the fourth subject, he says many objectors applied for reductions in the maximum rates on the raw materials of their industry and on coal. These objections were considered in dealing with the schedule of maximum rates; and in very many cases reductions were made. Among them were the Gas Companies, in the matter of coal and coke; and the steel trade, in respect of the rates on rolled iron and steel and structural work. The subject of the port rate on coal is dealt with under the seventh heading as follows.

In the schedule of maximum rates submitted by the Port Authority to the Board of Trade, the proposed rate on coal, culm, patent fuel, and coke was 6d. per ton, and that on coal dust and cinders 3d. These proposals created considerable alarm, largely because many persons failed to observe that as the coastwise maxima were to be half the maxima in the schedule, and these articles are almost entirely coastwise trade, the maximum rates really intended were 3d. and 1½d., with an entire exemption for bunker coal. The leading objectors, however, opposed any port rates on coal on two grounds—first, that it was the raw material of manufacturers; and, secondly, that any such rates would give a preference to railway-borne as against sea-borne coal. It was stated that out of 8¾ million tons of sea-borne coal imported last year into London, Messrs. Cory imported or handled 5 millions, mainly from the North of England and Scotch collieries, and South Wales; that about 3½ million tons were used by the Gas Companies; and 1½ million tons as bunker coal. The value of sea-borne coal was stated to average 10s. or 11s. a ton; most of the household coal, which would be of higher value, coming by rail. The trade is carried on in the river; thus getting the advantage of the port without any payment except, in some cases, a small charge for moorings. At Liverpool, 1d. per ton is actually charged on coal; at Belfast, 1½d.; considerably more at Bristol and Cork; 1d. at Hull and 1½d. at Grimsby; and at Goole an export rate of 1d. per ton was put on for the improvement of the Ouse Navigation. Export dues are also charged on the Tyne and Wear.

I considered that, in spite of the importance of coal to manufacturers, there was no reason why sea-borne coal should be excepted in London from the rule generally adopted elsewhere of making it pay something towards the maintenance of the port. So far as the evidence enabled me to compare the existing charges for sea freight and land freight, I was satisfied that the imposition of a moderate port rate on sea-borne coal would have but a slight effect on the present competition between different coalfields for the supply of London; and as it appears that the sea-borne trade is a very prosperous trade, it ought to find no difficulty in bearing whatever part of the rate it cannot pass on to the consumer. The consumer cannot be largely affected, though it will be in the power of the Gas Companies to exact from their customers the greater portion of any charge they may bear. But it is not unreasonable

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WARRINGTON & LONDON.

that the population of London generally, who are saved from the heavy local taxation for the improvement of their port which is imposed, for example, at Bristol, should indirectly make whatever small contribution for this purpose may result from a port rate on coal. I have therefore inserted in the schedule a maximum rate of 2d. per ton on coal, which would in practice probably work out at not more than 1d. actual rate; and as this is really a coastwise import, to avoid misconception I have proposed that this maximum shall apply to coastwise as well as oversea coal.

In concluding his report, Lord St. Aldwyn says: I venture to express a hope that it may be considered a fair, intelligible, and accurate account of all that passed at the inquiry, whether in matters of principle or detail, which it is necessary to bring under your notice; and that the Provisional Order and schedule of maximum rates in their present form may be found, while sufficiently providing for the requirements of the Port Authority, to meet so many of the objections that were made as materially to assist Parliament in the difficult work of introducing for the first time a system of port rates on goods into a port so important, so peculiar in its characteristics, and including so many conflicting interests, as the Port of London.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

The death of King Edward VII. is a theme upon which many pens will write with greater effect, though probably not with a deeper feeling of regret, than mine; for without doubt a great Ruler of the race, yet a man of the people—intelligent, active, sincere, and happy in all that he did—has passed away. There will be much interruption to business for a little, the first of which that has come under my notice being an intimation by order of Lord Provost Brown, of Edinburgh, that he has ordered to be postponed a meeting of the Edinburgh and Leith Gas Commissioners which had been called for Monday.

In the Edinburgh Town Council on Tuesday, Treasurer Leishman, in submitting the draft estimates of expenditure for the year from the 15th inst., said that the cost of public lighting showed an increase of nearly £2000 over the estimated figure of last year. He wished to make a serious complaint against the Lighting Committee and its officials. Nearly the whole of this amount was due to the increase in the number of stair lights. In recent years, the lights in the streets had been converted into incandescents; and this year they should have been prepared for a heavy diminution of the capital expenditure, as the conversion had now ceased. In October last, the Council sanctioned the conversion of the stair lights into incandescents. They were told, and they had reason to believe, that the system of incandescent lighting was very much better, that less gas would be burned, and that, consequently, there would be less to pay. In the proceedings which took place before the Parliamentary Committee, when the Gas Commissioners were getting their new Provisional Order, Mr. Herring, the Chief Engineer to the Gas Commission, said on oath he had prepared a statement showing that, after allowing for the cost of equipment, they would save £2000 in the first year, and that after two years the saving would be £3630 per annum. The Cleaning and Lighting Committee of the Town Council obtained an offer from the Gas Commission for the conversion of the lights. Mr. Mackay, their Inspector of Lighting, reported favourably upon the offer, and said that the Corporation were offered a superior system of stair lighting at no additional cost. The Inspector stated that a number of additional lights might be required in the common stairs; and he estimated the cost at £300 per annum. But what was the actual fact? By the estimate before them, which was supposed to run from May 15 next, there had been placed in common stairs in Edinburgh no fewer than 2013 extra lights. This was, in the main, how the increased sum was realized. The lights cost 17s. 6d. each, which made nearly £2000, instead of the £300 that the Inspector had said might be required. If this sort of thing were tolerated and passed by the Town Council, they would have no control at all over their finance. An official, without a single word of writing or authority, spent nearly £2000 per annum. It was one of the most unbusiness-like things ever done in the city. He wished those estimates cut down, for they had never been authorized. The estimates of all the Committees were sent back for reconsideration.

On Wednesday the Parliamentary Bills Committee of the Glasgow Council met, and considered the situation which has arisen with reference to the Corporation Gas Consolidation Bill. By a majority, it was agreed to recommend that the Bill should not be dropped, but be proceeded with in the House of Lords.

A Parliamentary Commission has been sitting in Edinburgh this week considering applications for statutory powers. One of these was by the Corporation of Kirkcaldy, who sought powers for the extension of the burgh boundaries, and, among other things, borrowing powers in connection with the gas undertaking, which they are about to acquire. There was no opposition to the gas clauses of the application; but the Commissioners took exception to some of the proposals. One of these was a clause in which power was to be taken to apply surplus gas profits in relief of the burgh general assessment, if the Corporation saw fit. This proposal, it was pointed out, was an alteration of the general law. If the Corporation were selling gas to outside communities, it would not be fair that the profit on the undertaking should be applied to the burgh assessment. Counsel for the Corporation pointed out that here it was different, because the Corporation were to sell gas to their own consumers only. As precedents, the powers given to Greenock at Westminster, and to Hamilton by Provisional Order (both last year), were cited. The undertaking would be carried on for behoof of the burgh only. The Earl of Kintore, who was Chairman, remarked that he would rather say it would be carried on for behoof of the consumers of gas. These, Counsel replied, were practically the ratepayers. Then the Chairman gave forth the dictum that they had electric light coming on more and

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more; and the people who consumed gas were generally poor people. Any surplus must go to gas purposes. The clause was accordingly deleted. In the application it was asked that the time for the repayment of money borrowed should be forty years; and it was asked that the forty years should run from the first repayment, which was to be in the second year after the Corporation commenced to supply gas. The Commissioners proposed that the period of repayment should be thirty years. Counsel said the Corporation had to contemplate additions and extensions to the undertaking; and he thought that some concession should be made. The purchase price was to be fixed by private bargain or by arbitration. The present consumers would have to bear the heavy end of the burden. At the start, they would have to pay interest on the price; and in addition they would have to pay into a sinking fund. They would have to pay one-fortieth part of the total capital sum; and, in addition, the total interest on the total rate. Counsel mentioned precedents—in the cases of Lisburn in 1909, and Ardrossan in 1901. The profits, as they stood, would just meet the interest and repayments. The Commissioners struck out the clause; and the conditions of repayment will thus be regulated as required by the Commissioners. The Corporation are empowered to charge for gas as they see fit. The minimum illuminating power is fixed at 14 candles, as determined by the "Metropolitan" argand burner No. 2 and the bar photometer. Users of gas-engines, if required by the Corporation, must use an effective anti-fluctuator; and power is taken to supply, but not to manufacture, gas-fittings, engines, stoves, ranges, and the like, for lighting and motive power.

The "Dundee Advertiser" on Wednesday of this week published this statement: "The Gas Committee have broken a meter combination. A fortnight ago they took in offers for the supply of meters for the year. Fifteen were sent in, and they were all the same price. Instead of accepting these offers, the Committee asked new offers for three years instead of one, with the result that a considerably lower price has been secured. The matter was reported at a meeting of the Gas Committee yesterday. Mr. High, the Convener, said that the Manager learned that there was an opportunity of breaking through the combination if they made a contract for three years. The result was that the lowest offer now was £443 below the former offers, and £630 lower than the contract for last year. They would have gone to Germany if they had not broken through the combination. It was remarked that the reduction was equal to ¼d. per 1000 cubic feet of gas. Mr. A. Yuill, the Engineer, said that this was so, but that they were paying £2000 more for coal, which would prevent them giving gas consumers any consideration. The offer for meters which was accepted was that of Messrs. R. Laidlaw and Son (Edinburgh), Limited, of Edinburgh."

In Dundee there is at present a movement in the direction of promoting an amalgamation between the city and the adjacent burghs of Broughty Ferry and Monifieth. A Sub-Committee of the Dundee Town Council have prepared a memorandum on the subject, a copy of which has been sent to the Town Councils of the smaller burghs, along with an invitation to meet in conference on the matter. In this document it is pointed out that in gas supply Broughty Ferry would, in the event of amalgamation, have gas at 7d. per 1000 cubic feet less than at present—being a total saving of £1750 on their annual sale of, roughly, 60 million cubic feet of gas. As 1d. in the pound in Broughty Ferry yields £271, the saving would be equal to 6½d. in the pound on its rating. Further, in Dundee, cookers, &c., are supplied free; and these in Broughty Ferry yield a revenue of £107. The withdrawal of the rent charge, it is set forth, could not fail to greatly increase the use of gas appliances; and in Dundee's ratio this would come to about £500. Monifieth would have gas at 2s. 6d. per 1000 cubic feet less than at present—a total saving, on their annual sale of about 7 million cubic feet, of £875. As 1d. in the pound in Monifieth yields £71, this represents 1s. in the pound on their rating.

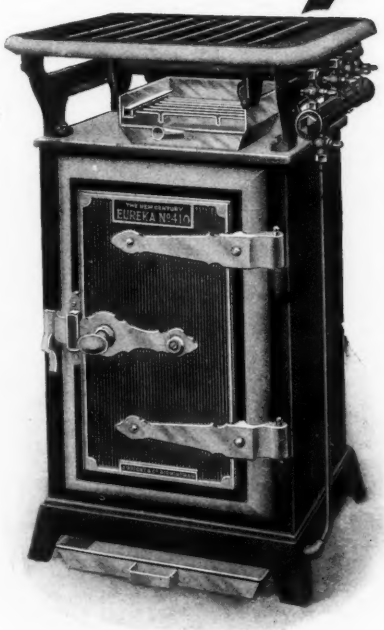
Particulars were laid before the Carnoustie Town Council on Monday evening as to the purchase price, expenses, &c., payable on the 16th inst., in connection with the taking over of the gas undertaking. The purchase price amounted to £21,000. The Committee recommended the Council to fix the prices for the year from the 15th inst. at 3s. 6½d. per 1000 cubic feet for gas consumed through ordinary meters, and at 4s. 2d. for gas consumed through prepayment meters. They further recommended that no meter-rents be charged, and that gas-cookers be supplied free. The Convener said he hoped they would be able to make a reduction in the charges in twelve months.

The Parliamentary Commission sitting in Edinburgh this week, were to have considered an application by the Corporation of Fraserburgh for a Provisional Order, the purpose of which was to augment the water supply of the town; but opposition to the measure having been overcome, it was withdrawn from the consideration of the Commissioners, and will be dealt with at Westminster as an unopposed measure. The scheme provides for taking a supply of water from Fedderate—a distance of 15 miles from the town. The estimated cost of the works is £48,000.

The Strathmiglo Gaslight Company, who had been in existence for seventy years, have transferred their business as a going concern to a new Company, for a payment. The old Company was formally dissolved last week.

Yesterday, in the Sheriff Court at Peterhead, application was made on behalf of the Fraserburgh Town Council to have their resolution adopting the Burghs Gas Supply (Scotland) Act, recently confirmed by the ratepayers, recorded in the books of the Sheriff Court. Evidence was submitted as to the steps which have been taken in the procedure, and the advertisement of the application, to which there had been no objection. Sheriff Henderson Begg granted the application.

The Town Clerk of Carlisle has reported to the Water Committee that he has been unable to complete the deed of grant of the land and easements required from Lord Carlisle for the purposes of the Geltsdale Water-Works, owing to the fact that Lord Carlisle's Solicitors wish to insert in the deed a clause restricting the Corporation's rights-of-way and their use of the land. The Town Clerk was instructed to make application to the Courts in order to have the matters in dispute finally settled.



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234.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *May* 7.

Sulphate of Ammonia.

Owing to the continued paucity of new business, the weakness in the market has become more accentuated within the last few days, and the decline in prices has been more rapid. There is not much inquiry for export, and demand for home consumption has also slackened off. The nearest values at the close of the week are, consequently, £11 15s. per ton f.o.b. Hull, £11 16s. 3d. f.o.b. Liverpool, and £11 18s. 9d. f.o.b. Leith. The makers have so far not made any reduction in their quotations for future delivery; but it is reported that there are speculative sellers over the second half of this year at less money than manufacturers are asking.

Nitrate of Soda.

The market for this article remains dull, and the spot quotations now are 9s. 4½d. per cwt. for ordinary 95 per cent. quality, and 9s. 7½d. for 96 per cent.

LONDON, *May* 9.

Tar Products.

The markets for tar products have been firm during the past week. Pitch has again improved; and the position is very firm for prompt and for forward delivery. Creosote is steady, though there is not much new business. The market in crude carbolic is still very unsettled, and consumers' ideas cannot be brought up to those of manufacturers; consequently business is practically at a standstill. Naphthas and benzols remain firm.

The average values during the week were: Tar, 18s. to 22s., *ex* works. Pitch, London, 40s.; east coast, 39s. to 40s.; west coast, 38s. to 39s. f.a.s. Mersey ports, 39s. f.o.b. others. Benzol, 90 per cent., casks included, London, 8d. to 8½d.; North, 8d.; 50-90 per cent., casks included, London and North, 9d. Toluol, casks included, London, 10½d.; North, 10d. to 10½d. Crude naphtha, in bulk, London, 4¼d. to 4⅜d.; North, 4¼d. to 4⅜d.; solvent naphtha, casks included, London, 1s. 3½d. to 1s. 4d.; North, 1s. 4d. to 1s. 6d.; heavy naphtha, casks included, London, 1s. to 1s. 1d.; North, 11d. to 1s. Creosote, in bulk, London, 2⅛d. to 2⅜d.; North, 2d. to 2¼d. Heavy oils, in bulk, 2¾d. to 2⅞d. Carbolic acid, 60 per cent., casks included, east coast, 1s. 0¼d.; west coast, 1s. Naphthalene, £4 10s. to £8 10s.; salts, 40s. to 42s. 6d., bags included. Anthracene, "A" quality, 1½d. per unit, packages included and delivered.

Sulphate of Ammonia.

The market has been rather quiet during the past week; but towards the close there was a little inquiry, which, however, did not affect the market. To-day actual Beckton is quoted at £12; and outside makes, upon Beckton terms, £11 12s. 6d. to £11 13s. 9d. In Hull, the price is £11 17s. 6d. to £11 18s. 9d.; Liverpool, £11 17s. 6d.; Leith, £11 18s. 9d. to £12; Middlesbrough, £11 17s. 6d. to £11 18s. 9d.

COAL TRADE REPORTS.

Northern Coal Trade.

There is now an ample supply of coal, and prices have for some kinds shown a further slight fall. In the steam coal trade, best Northumbrian steams are from 11s. 3d. to 11s. 4½d. per ton f.o.b.; second-class steams are 10s. to 10s. 6d.; and steam smalls are steady at from 6s. to 7s. 6d. The collieries are practically all at work; and the demand at present barely furnishes full time. In the gas coal trade, the home consumption is naturally low at this season of the year; but the exports are fair. Durham gas coals vary in price according to quality—the usual classes being about 10s. to 10s. 9d. per ton f.o.b.; and "Wear" specials about 11s. 6d. As to contracts, little is yet known as to the large Metropolitan ones; but they do not seem to be very eager to close them. It is thought that one or two will be soon settled; and this may define the extent of the rise in prices that is generally to be looked for. Some small export contracts for gas coals are settled at prices near to those that are current, as quoted above; but they are not large enough to affect the market much. Coke is steady; and as gas coke is now in smaller output, the price is maintained at from 13s. 9d. to 14s. per ton f.o.b. for good quality.

Scotch Coal Trade.

Trade is not encouraging. It is felt that orders for Baltic ports are being held over, which gives a depressed feeling to the market. Coal-owners are waiting for this trade, and are not reducing prices. The other markets are fairly brisk. The prices quoted per ton f.o.b. Glasgow are: Ell, 9s. 3d. to 10s. 3d.; splint, 10s. 3d. to 10s. 6d.; steam, 9s. 3d. to 9s. 6d. The shipments for the week amounted to 314,036 tons—a decrease upon the preceding week of 8247 tons, but an increase upon the corresponding week of 2415 tons. For the year to date, the total shipments have been 5,034,146 tons—an increase upon the corresponding period of 694,552 tons.

Chorley Gas-Works Results.—The Chorley Town Council have had before them the report of the Gas Manager for the past year. It stated that the total quantity of gas made was 151,042,000 cubic feet, an increase of 10,430,000 cubic feet over the previous year. There were 13,979 tons of coal carbonized; the yield being 10,636 cubic feet per ton. Of the consumption, 133,180,700 feet was for lighting, and 9,380,200 feet for power. The consumption of gas by mills, workshops, and large consumers showed a reduction of 6·6 per cent.; and with the decrease in the previous year of 11·7 per cent., this made a total reduction of 18·3 per cent. in two years. During the twelve months, 615 new consumers had been connected; and the total was now 8546. Alderman Whittle, in referring to the report, said that, but for the bad trade, the increase would have been doubled.

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The Birmingham Gas Secretaryship.

The following statement appeared in the "Birmingham Mail" last Thursday: Some difficulty is being experienced in finding a gentleman to fill the responsible position rendered vacant by the death of Mr. G. Hampton Barber, the Secretary of the Birmingham Gas Department. The preliminary selection of a suitable man for the post is in the hands of a small Sub-Committee consisting of Alderman Sir Hallewell Rogers (Chairman of the Gas Committee), Aldermen Lloyd and Bishop, and Councillor Murray; and these gentlemen are devoting considerable time and attention to the matter with which they are charged. As may be imagined, there were many applications for the post, having regard to the probable salary; and the Sub-Committee have not only reduced the number of these applicants down to a few, but have also interviewed the most likely of the candidates whose names remain on the reduced list. At a meeting this morning, another applicant was interviewed; and it may be that further interviews will be necessary. Anyhow, it is not regarded as probable that the Sub-Committee will be in a position to make any final report or recommendation on the subject to the meeting of the full Gas Committee on Monday.

New Holder for the Salford Gas-Works.—At last week's meeting of the Salford Town Council, Alderman Phillips, the Chairman of the Gas Committee, moved the confirmation of the Committee's minute that the tender of Messrs. Newton, Chambers, and Co., Limited, of Sheffield, for the supply and erection of a two-lift gasholder, 100 feet in diameter, be accepted. He explained that the holder was for the Bloom Street works; and the cost would be £3967, including certain alterations to the guide-framing. The motion was carried without discussion.

Mansfield Gas-Works Extensions.—A report submitted by the Gas Engineer (Mr. A. Graham) to a special meeting of the Mansfield Town Council stated that during the past winter every retort had been in use; and the maximum daily output was on Dec. 22—746,000 cubic feet. There was no reason to doubt that this figure would reach over 800,000 cubic feet during the coming winter. Additional gas-making plant should therefore be provided without delay. A deputation of six members of the Gas Committee had visited several towns where carburetted water gas was being made; and they were of the unanimous opinion that it would be advantageous to instal a similar plant to that inspected at Lincoln and Preston. Tenders had been secured; and the Committee recommended a plant to produce 330,000 cubic feet per 24 hours, at a cost of £3820. The provision of the gasholder, alterations to buildings, new roof, foundations, and gas-mains would raise the expenditure to a total of £7000. The Committee had adopted the report; and the Council did the same, together with a resolution that the Council make application to the Local Government Board for sanction to a loan of £7000 for the purpose, repayable within a period of thirty years.

Sales of Stocks and Shares.

At the Mart, Tokenhouse Yard, E.C., last Tuesday, Messrs. A. & W. Richards sold, by order of executors, stocks and shares in various gas companies. The first lots offered consisted of £500 of 5 per cent. consolidated ordinary stock of the Chigwell, Loughton, and Woodford Gas Company, the last dividend on which was at the rate of 5½ per cent. per annum; and it fetched from £123 to £125 per £100. A few fully-paid £10 "A" shares (10 per cent.) in the Harrow and Stanmore Gas Company, carrying dividend at the rate of 10½ per cent. per annum, realized £23 apiece; some "C" shares (7 per cent.), of the same nominal value, carrying £7 7s. per cent. dividend, fetching from £15 7s. 6d. to £15 12s. 6d. each. A parcel of 4 per cent. perpetual debenture stock of the same Company was placed at from £100 10s. to £101 5s. per £100. Some 5 per cent. preference stock of the Horley District Gas Company was sold at par; and a small quantity of 4 per cent. irredeemable debenture stock at £95 per £100. Ten fully-paid £10 "A" shares in the Waltham Abbey and Cheshunt Gas Company, ranking for a standard dividend of 10 per cent., but carrying 8½ per cent., fetched £18 10s. each; and some 7 per cent. "C" shares, of the same nominal value, but carrying 6½ per cent. dividend, realized from £13 5s. to £13 15s. each. A parcel of 4 per cent. perpetual debenture stock of the same Company was sold at from £100 to £101 per £100. The last lots offered consisted of £1000 of new ordinary stock of the Southend Gas Company, ranking for a standard dividend of 5 per cent., but carrying 5¾ per cent., fetched from £120 5s. to £120 10s. per £100. The following day, Messrs. Fox, Bousfield, and Co. sold at the Mart some original £25 shares in the Lewes Water Company at £72 and £72 10s. apiece; two additional shares at £55 and £45 each; and £60 of 5 per cent. preference stock at £80.

Smaller Rates at Malvern.—It is a pleasure in these times to be able to chronicle an instance in which it is found possible to make a substantial reduction in the rates; and Malvern affords us an opportunity of doing so. Here the Council find themselves with a handsome surplus on the past year; and consequently they have been able to fix the new rate at 4s., which is a decrease of 7d. in the pound. In this connection, it may be remarked that the gas undertaking has done exceedingly well during the past year; the general expenditure having been £911 less than the estimate, while the receipts were considerably in excess of the amount estimated—a state of things on which, as a local paper points out, "the Manager (Mr. W. J. Rendell Baker) is entitled to the thanks of the ratepayers." The encouraging outlook has even led one writer to put forward the following: "Possibly, in the course of a few years, we shall see the gentlemen who used to be called rate-collectors calling round with each resident's share of the profits on the gas and electricity works. The ratepayers will then be the rate-collectors, and the collectors the ratepayers, and Malvern will be truly the Queen of Health Resorts."

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Municipal and Health Exhibition.—The second Municipal and Health Exhibition was opened at the Royal Agricultural Hall, Islington, last Saturday. It has been organized mainly for the purpose of promoting municipal work by bringing under one roof all the latest appliances and inventions for sanitation, road making, and building construction; and it will remain open until the 14th inst. During the week a series of non-technical lectures on various departments of municipal undertakings will be given. The Organizing Manager is Mr. F. W. Bridges (one of the organizers of the Earl's Court Gas Exhibition), assisted by a strong Honorary Advisory Committee.

New Joint-Stock Companies.—The East Hants Gas Company, Limited, has been registered with a capital of £30 000, in £10 shares (1500 "A" and a like number of "B") to carry on the business of a gas and water company, and to acquire the existing gas-works and plant at Woolmer. The Maltby and Bramley Gas Company, Limited, has been registered with a capital of £15,000, in £1 shares, to manufacture and supply gas for lighting, heating, or motive power to certain parishes in the county of York, and to carry on the business of a gas company in all its branches; also to take over all or any of the property, interest, and liabilities, &c., of Mr. H. Ellison, of Cleckheaton, manufacturing chemist, in and under two agreements—viz., one between H. Ellison and H. Mollekin with respect to the supply of gas to the new model village at Maltby, and the other with respect to the laying of gas-mains.

The Gas Committee's revenue account, presented to the Knaresborough Urban Council some days ago, showed receipts £4418 and expenditure £3768—a gain on the year's working of £649, as against £508 the previous year.

In a paragraph which appeared in the "JOURNAL" last week (p. 332), it was stated that among the orders lately secured by Messrs. Ashmore, Benson, Pease, and Co. was one for a condenser and tar-extractor for the Luton Gas Company. We are asked to say that the statement is incorrect.

The New Mills Urban District Council have agreed to apply to the Local Government Board for power to borrow £1650 for purposes of extension and other matters connected with the gas undertaking. They have also entertained a proposal to reduce the price of gas by 1d. per 1000 cubic feet. The offer of the Gas Committee to give £350 out of the profits for the relief of the rates was accepted.

We have received from Messrs. Trier Bros., of Caxton House, Westminster, a pamphlet containing particulars of "Stauffer's Lubricant" (a machine grease of which they are the sole makers), and of their lubricators and engineering appliances; the latter being shown in considerable variety. The lubricant was the result of an attempt made more than a quarter-of-a-century ago to replace liquid oil; and it is claimed for it that it has maintained its standard of excellence.

WANTED, FOR SALE, CONTRACT, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Situations Vacant.

GAS LIGHTING EXPERT. No. 945. c/o Rudolf Mosse, Hamburg.
RESIDENT ENGINEER (WATER COMPANY). No. 5236.
DRAUGHTSMAN. No. 5235
DRAUGHTSMAN. No. 5239.
LABORATORY ASSISTANT. No. 5238.
GAS MANAGER, &c. No. 5231.
SHOW-ROOM ATTENDANT. No. 5213.
CANVASSERS. No. 5249.

Situations Wanted.

GAS METER TRADE (AS MANAGING DIRECTOR OR MANAGER). No. 5237.
REPRESENTATIVE (GAS PLANT, &c.), No. 313. c/o Barker's, Cornhill, E.C.
LEADBURNER. No. 395.

Plant, &c. (Second Hand), for Sale.

EXHAUSTER, RETORT MOUTHPIECES, &c. Grays and Tilbury Gas Company.
GASHOLDER FRAMING, GIRDERS, &c. Gosport Gas Company.
"JOURNAL" VOLUMES. R. Lievesley, Stockport.
PURIFIERS. Tyldesley-with-Shakerley Urban District Council.

Patent Licences for Disposal, &c.

SPIRALLY WOUND TUBES AND MACHINES FOR MAKING SAME. Lloyd Wise and Co., Lincoln's Inn Fields, W.C.
VAPOUR LAMP AND PETROLEUM STOVES. L. Duvinage, Brussels.

Stocks and Shares.

BARNET GAS COMPANY. May 24.
DORKING GAS COMPANY. May 24.

TENDERS FOR

Benzol and Benzolized Creosote.

WALSALL CORPORATION. Tenders by May 21.

Coal and Cannel.

ALLIANCE AND DUBLIN CONSUMERS' GAS COMPANY.
BARROW-IN-FURNESS CORPORATION. Tenders by May 24.
BRECON GAS COMPANY. Tenders by May 31.
BURTON-ON-TRENT TOWN COUNCIL. Tenders by May 18.
BUXTON GAS DEPARTMENT. Tenders by May 28.
CHORLEY GAS DEPARTMENT. Tenders by May 18.
CIRENCESTER GAS COMPANY. Tenders by June 2.
DROITWICH GAS DEPARTMENT. Tenders by May 20.
GUILDFORD GAS COMPANY. Tenders by May 20.
GLOUCESTER GAS COMPANY. Tenders by May 30.
HEYWOOD GAS DEPARTMENT. Tenders by May 12.
LINCOLN GAS DEPARTMENT. Tenders by May 20.
OMAGH URBAN DISTRICT COUNCIL. Tenders by May 31.
TIVERTON TOWN COUNCIL. Tenders by June 4.
TYLDESLEY-WITH-SHAKERLEY URBAN DISTRICT COUNCIL. Tenders by May 30.

General Stores (Lead Pipe and Pig Lead).

TYLDESLEY-WITH-SHAKERLEY URBAN DISTRICT COUNCIL. Tenders by May 30.

Lime.

WALSALL CORPORATION. Tenders by May 21.

Meters.

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CHESTER GAS COMPANY. Tenders by May 12.

Tar and Liquor.

BARRY URBAN DISTRICT COUNCIL. Tenders by May 30.
BURTON-ON-TRENT TOWN COUNCIL. Tenders by May 18.
BUXTON GAS DEPARTMENT. Tenders by May 28.

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

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Any required number of
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Results Guaranteed. No Working Costs.
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Address, in first instance, No. 5237, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

IMPORTANT to Manufacturers of Gas- Works Plant and Gas-Meters Advertisers, being in close touch with LARGE GAS-WORKS SCHEME in which they have great influence, wish to get in Communication with Makers of Complete Plant, with view to Business.
Address Box 313, care of Barker's, 2, Castle Court, Cornhill, E.C.

WANTED, an Attendant for London Gas-Stove Show-Room. Young, Energetic, and Experienced.
Apply, by letter, to No. 5233, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

CANVASSERS wanted for Gas-Cooker Trade. Only Reliable and Experienced Men need Apply.
Write, with full Particulars, to No. 5240, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

RESIDENT Engineer wanted for a Water Company in the South of England.
Apply, by letter, stating Age and Salary required, with full Particulars of Experience and *Copies* of recent Testimonials, to No. 5236, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

DRAUGHTSMAN wanted (by a Firm of Gas Engineers and Contractors) who must be well up in Modern Plant and Competent to Take Out Quantities for Estimating.
Apply, by letter, stating Age, Experience, and Salary required, to No. 5235, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

WANTED, a Gas Manager, for a Small Works (Stoker kept), competent to do the Plumbing Work of Brewery. Wages, 37s. 6d. per week, rising to 40s.
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ASSISTANT wanted by a well known Firm of Gas Engineers in their LABORATORY. Must have knowledge of Chemistry, be capable of Testing and Experimenting with Gas Apparatus for Lighting, Cooking, and Heating, also knowledge of Gas-Testing Apparatus.
Apply, by letter, to No. 5238, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

GERMAN Firm, making a speciality of the Construction of RETORT FURNACES, and Possessing own Manufactory of Fire-Clay Bricks and Retorts, want a GAS LIGHTING EXPERT for Confidential Position to introduce its economically working Furnace Constructions and well-proved Retort and Fire-Clay Materials.
Address "F.B.T." 945, care of Rudolf Mosse, Hamburg, Germany.

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WANTED for a period of Twelve Months certain (to be extended if required), a thoroughly Efficient and Experienced Gas-Works DRAUGHTSMAN, competent to Take Out Quantities for Estimating. Wages, £130.
Apply, by letter, stating Age, Experience, and full Particulars, to No. 5239, care of Mr. King, 11, Bolt Court, Fleet Street, E.C.

FOR SALE—A Gas Exhauster by Alfred Williams and Co., London. Capacity 15,000 Cubic Feet per Hour. In good Condition. Also 19 RETORT MOUTHPIECES and LIDS, 21 in. by 15 in. Cheap.
For further Particulars, Apply to H. C. Borradaile, Secretary, Grays and Tilbury Gas Company, Grays.

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FOR SALE—Framing for Single-Lift GASHOLDER, 20 feet deep; Seven Heavy CAST-IRON Columns, 3 feet square base, 2 ft. by 1 ft. 10 in. diameter; and LATTICE GIRDERS, 2 feet deep. Removed from Tank 74 ft. 6 in. diameter.
Apply to the GOSPORT GAS AND COKE COMPANY, GOSPORT.

URBAN DISTRICT COUNCIL OF TYLDESLEY-WITH-SHAKERLEY.

SECOND-HAND PURIFIERS.

THE Gas Committee have for Disposal Two Water-Lute PURIFIERS, 18 feet square by 5 feet deep, with 18-inch Connections and Lifting Gear.
The Purifiers may be Viewed, and further Particulars obtained, on Application to,
H. R. S. WILLIAMS,
Gas and Water Manager.
Gas-Works, Tyldesley,
May 5, 1910.

CORPORATION OF DROITWICH.
(GAS DEPARTMENT.)

THE Gas Committee are prepared to receive TENDERS for the Supply of 2000 Tons of Best Screened GAS COAL, to be delivered to Droitwich (Great Western Railway), as required during the Twelve Months ending June 30, 1911; also for a similar Quantity for the Year ending June 30, 1912.
The Committee reserve the right to accept Tenders for the whole or any portion of the Quantity offered, and do not bind themselves to accept the lowest or any Tender.
Sealed Tenders, endorsed "Tender for Gas Coal," to be sent to S. J. Tombs, Esq., Town Clerk, Droitwich, not later than the 20th inst.
Forms of Tender to be obtained from the undersigned.
F. SHEWRING,
Manager.
Gas-Works, Droitwich,
May 4, 1910.

LINCOLN CORPORATION.
(GAS DEPARTMENT.)

TENDERS FOR COAL.

THE Gas Committee of the Lincoln Corporation invite TENDERS for the Supply of 30,000 Tons of Screened or Unscreened GAS COALS and NUTS, to be delivered during a period commencing the 1st of July, 1910, and terminating the 30th of June, 1911.
Further Particulars and Forms of Tender may be obtained from the undersigned.
Sealed and endorsed Tenders, addressed to the Chairman of the Gas Committee, must be delivered on or before the 20th of May next.
The Committee do not bind themselves to accept the lowest or any Tender.
JNO. CARTER,
Manager.
Gas Offices, Lincoln,
April 22, 1910.

BOROUGH OF TIVERTON.

TENDERS FOR COAL.

THE Town Council are prepared to receive TENDERS for the whole or part of 4000 Tons of Freshly Wrought GAS COAL, Screened or Unscreened, including NUTS (giving full Particulars of Coal, with Analysis), to be delivered at the Railway Siding adjoining their Gas-Works at Tiverton during the period of One Year, and in such Quantities as may be directed by the Gas Manager.
Further Particulars and Form of Tender (which must be used) may be obtained on Application to Mr. Clark Jeffery, Gas Manager, Tiverton.
Sealed Tenders, endorsed "Tender for Gas Coal," and addressed to the undersigned, must be received on or before Saturday, the 4th day of June, 1910.
The Committee do not bind themselves to accept the lowest or any Tender.
By order
C. M. HOLE,
Town Clerk.
Tiverton, May 2, 1910.

BARRY URBAN DISTRICT COUNCIL.

TENDERS FOR TAR.

ALTERNATIVE Tenders are invited for the Purchase of the Surplus TAR produced at the Gas-Works during One, Two, or Three Years from the 1st of June next, approximately 100,000 Gallons per Annum.
The Tar will be pumped into Contractor's Tank Trucks at the Gas-Works Siding, Barry.
The person whose Tender is accepted will be required to enter into a Contract and also give a Bond, with approved Sureties, for its due performance.
The highest or any Tender not necessarily accepted.
Further Particulars may be obtained from Mr. T. E. Franklin, Engineer and Manager, Gas-Works, Barry.
Sealed Tenders, endorsed "Tender for Tar," to be sent to the undermentioned not later than Twelve o'clock noon on Monday, the 30th of May, 1910.
T. B. TORODFF,
Clerk.
Public Offices, Barry,
May, 1910.

BOROUGH OF CHORLEY.
(GAS DEPARTMENT.)

TENDERS are invited for the Supply and Delivery of GAS MAKING FUEL.
Full Particulars of Requirements may be obtained on Application to Mr. J. W. Allin, Gas-Works, Chorley.
Tenders, addressed to me, to be delivered not later than Wednesday, May 18.
The Corporation do not bind themselves to accept the lowest or any Tender.
JNO. MILLS,
Town Clerk.
Town Hall, Chorley,
May 2, 1910.

GUILDFORD GASLIGHT AND COKE COMPANY.

COAL.

THE Directors of the above Company are prepared to receive TENDERS for the Supply of 13,000 Tons of Durham and South Yorkshire GAS COAL (Screened or Unscreened), to be delivered free at Guildford Station, between the 1st of July, 1910, and the 30th of June, 1911, in such Quantities and at such times as required.
The Directors reserve the right to accept the whole or any portion of the Quantity offered, and do not bind themselves to accept the lowest or any Tender.
Tenders to be endorsed "Tender for Coal," and to be sent to Ferdinand Smallpeice, Esq., J.P., Chairman of the Gas Company, on or before Ten a.m. on Friday, the 20th of May, 1910.
By order,
WILLIAM TITLEY,
Secretary.
Gas Offices, Guildford,
May 2, 1910.

URBAN DISTRICT COUNCIL OF TYLDESLEY-WITH-SHAKERLEY.

TENDERS FOR THE SUPPLY OF COAL AND GENERAL STORES.

THE Gas and Water Committee invite TENDERS for the Supply during the Twelve Months ending June 30, 1911, of the following:—
4500 Tons of GAS COAL, COBBLES, or NUTS.
LEAD PIPE, (Gas and Water) and PIG LEAD.
CAST-IRON PIPES and SPECIALS.
WROUGHT-IRON TUBES and FITTINGS.
GAS-METERS.
Forms of Tenders and Particulars may be obtained from the undersigned.
Sealed, endorsed Tenders to be delivered to W. J. Matthews, Esq., Clerk to the Council, Tyldesley, on or before Monday, May 30, 1910.
The Committee do not bind themselves to accept the lowest or any Tender, and reserve to themselves the right to divide any Contract.
H. R. S. WILLIAMS,
Engineer and Manager.
Gas and Water Works,
Tyldesley, May 5, 1910.

BOROUGH OF BURTON-UPON-TRENT.

THE Town Council of this Borough invite TENDERS for:—
GAS COAL.
The Supply of 35,000 Tons of GAS COAL, to be delivered at the Gas-Works during the Twelve Months ending June 30, 1911, in accordance with the Form of Tender and Conditions which may be obtained from the undersigned.
TAR.
The Purchase of the Surplus TAR, which will be produced and delivered into the Purchaser's Tank Waggons at the Gas-Works during the Twelve Months ending June 30, 1911.
Terms of Payment Net Cash Monthly.
Tenders, endorsed "Coal" and "Tar" respectively, are to be delivered to the Assistant-Manager at the Gas-Works, Burton-upon-Trent, on or before Wednesday, May 18 inst.
The Council do not bind themselves to accept any Tender.
T. N. WHITEHEAD,
Town Clerk.
Town Hall, Burton-upon-Trent,
May 4, 1910.

BUXTON URBAN DISTRICT COUNCIL.
(GAS DEPARTMENT.)

THE Gas Committee invite Tenders for:—
1.—GAS COAL, NUTS, and CANNEL.
The Supply of 6000 Tons of Best Screened GAS COAL or large NUTS to be delivered as required, at the Gas-Siding, Midland Railway, Buxton, during the Twelve Months ending July 31, 1911, and 3500 Tons of CANNEL to be delivered during the Twelve Months ending June 30, 1911, in accordance with the Specification and Conditions, which may be obtained from the Gas Engineer, Mr. H. Barker, Town Hall, Buxton.
Sealed Tenders, endorsed "Coal" and "Cannel" respectively, are to be delivered to the undersigned on or before Saturday, the 28th inst.
The Council do not bind themselves to accept the lowest Tender, and reserve the right to divide the Contracts.
2.—SURPLUS TAR AND AMMONIACAL LIQUOR.
The Purchase of the Surplus TAR and the whole of the AMMONIACAL LIQUOR which may be produced at the Buxton Gas-Works during the Twelve Months ending June 30, 1911. The same to be delivered into Contractor's Tanks at the Gas-Siding, Midland Railway, Buxton.
Sealed Tenders, endorsed "Tar" and "Liquor" respectively, are to be delivered to the undersigned on or before Saturday, the 28th inst.
Forms of Tender may be obtained on Application to the Gas Engineer,
By order of the Committee,
(Signed) JOSIAH TAYLOR,
Clerk.
Town Hall, Buxton,
May 7, 1910.

THE Directors of the Alliance and Dublin Consumers' Gas Company invite TENDERS for the Supply of 85,000 Tons of GAS COAL, to be delivered c.i.f. Dublin, June, 1910 and 1911, in such Quantities as may be required.
The Directors do not bind themselves to accept these or any Tender.
For full Particulars Apply to FRANCIS T. COTTON, Esq., Secretary and Manager, Alliance and Dublin Consumers' Gas Company, D'Olier Street, DUBLIN.

CHESTER UNITED GAS COMPANY.

TENDERS FOR PURIFIERS AND ROOF.

THE Directors of the above Company invite TENDERS for the REMOVAL and RE-ERECTION of Two existing PURIFIERS, 24 feet by 22 feet by 5 feet deep, and Alterations to Connections, the SUPPLY and ERECTION of Two New PURIFIERS, 24 feet by 22 feet by 5 feet deep, with Connections and Weck Centre Valve to work the Set of Four, Two overhead Travelling Cranes, and about 100 Tons of STEEL and CAST-IRON WORK in Roof over Purifiers and Oxide Sheds at the Roodee Gas-Works, Chester.
Drawings, Specification, Bill of Quantities, and Form of Tender may be obtained on Application to the Manager, Roodee Gas-Works, on payment of One Guinea, which will be returned on receipt of a *bond-fide* Tender and Particulars supplied.
Tenders to be delivered (sealed) on or before Nine a.m. on Thursday, the 12th day of May, 1910, addressed to the undersigned and endorsed "Tender for Purifiers and Roofs."
The Directors do not bind themselves to accept the lowest or any Tender.
FRED. A. PYE,
Secretary and General Manager.
Gas Company's Offices,
Cuppin Street, Chester,
April 23, 1910.

GLOUCESTER GASLIGHT COMPANY.

TENDERS FOR GAS COAL.

THE Directors of the above Company invite TENDERS for the Supply of about 34,000 Tons of GAS COAL for One Year from the 1st day of July next, in such Monthly Quantities as may be required by the Company.
Tenders to state the Price delivered at the Midland Railway Sidings, Hempsted, near Gloucester, or the Great Western Railway Wharf, Llanthony, Gloucester; or, if sent (as preferred) by Water, the price f.o.b., and also the price delivered at the Gas Company's Wharf on the Gloucester and Berkeley Canal.
Further Particulars and Forms of Tender may be obtained from the undersigned.
Sealed Tenders, endorsed "Tender for Coal," specifying the Description and Quality of the Coal, to be addressed to the Chairman, Gas Offices, Eastgate Street, Gloucester, and delivered not later than Monday, the 30th day of May next.
The Directors reserve to themselves the right to accept the whole or any portion of any quantity offered, and do not bind themselves to accept the lowest or any Tender.
By order,
WILLIAM E. VINSON,
Secretary.
Gas Offices, Gloucester,
May 2, 1910.

BOROUGH OF WALSALL.

TO LIME MASTERS.

THE Corporation of Walsall invite TENDERS for the Supply of about 800 Tons of LIME for their Gas-Works, and about 250 Tons for their Sewage Farm at Bescot, which will be required during One Year from the 1st day of July next, the deliveries to be in such Monthly Quantities as the Corporation may from time to time direct.
The Lime is to be hand-picked and clear from Refuse and Ashes, and to be delivered at the Corporation Siding at the Pleck Gas-Works and at the Sewage Farm, Bescot, as required.
Payments Monthly.
The Corporation do not bind themselves to accept the lowest or any Tender, and they will not accept the Tender of any person or Firm paying less than the Standard Rate of Wages to their Workmen.
Tenders, sealed and marked outside "Tender for Lime," are to be sent to the undersigned on or before Saturday, the 21st of May inst.
JOHN R. COOPER,
Town Clerk.
Council House, Walsall,
May 2, 1910.

BOROUGH OF WALSALL.

TENDERS FOR BENZOL AND FOR BENZOLIZED CREOSOTE.

THE Corporation of Walsall invite TENDERS for about 6000 Gallons of 90 per cent. BENZOL for Enriching purposes; and also TENDERS for about 2000 Gallons of BENZOLIZED CREOSOTE, free from Naphthalene, to be delivered during One Year from the 1st of July next, in Drums or in Casks, to the Corporation siding at the Pleck Gas-Works Walsall.
Further Particulars may be obtained from the Engineer, at the Pleck Gas-Works, Walsall.
The Corporation do not bind themselves to accept any Tender, and they reserve the right to divide the Contract between several Firms.
The Corporation will not accept the Tender of any Person or Firm paying less than the Standard Rate of Wages to their Workmen.
Tenders, sealed and marked outside "Tender for Benzol," or "Tender for Benzolized Creosote," are to be sent to the undersigned not later than Saturday, the 21st of May inst.
When tendering for the Benzol, the amount of purity should be stated.
JOHN R. COOPER,
Town Clerk.
Council House, Walsall,
May 2, 1910.

BRECON GAS COMPANY.

TENDERS are invited for the Supply of 2500 Tons of COAL, as required, to include Large, Cobbles, Nuts, Peas, and Slack, delivered at Brecon Railway Station, Twelve Months ending June, 1911.—Expert Analysis to accompany each Tender, and Price quoted to be Net Cash Monthly, 2240 lbs. to the Ton.

The Company do not bind themselves to accept the lowest or any Tender.

Tenders to be sent in on or before noon the 31st inst., endorsed "Tenders for Coal," and addressed to the Chairman of the Company, Lion Chambers, BRECON.

OMAGH URBAN DISTRICT COUNCIL.

THE above Council are prepared to receive TENDERS for the Supply and Delivery of 2000 Tons, more or less, of Best Screened GAS COAL, for delivery during the Year ending June 30, 1911.

The Council reserve to themselves the right to divide the Contract as they may think fit.

Tender Forms may be had on Application to the undersigned, to whom all Tenders are to be sent, endorsed "Coal," on or before May 31, 1910.

WM. M. DOWNIE,
Manager.

Gas Office, Omagh,
May 4, 1910.

CIRENCESTER GAS COMPANY, LIMITED.

THE Directors are prepared to receive TENDERS for the Supply of 4000 to 5000 Tons of GAS COAL to be delivered free to their Siding at the Watermoor Station of the Midland and South Western Junction Railway Company during the Twelve Months commencing July 1, 1910, at such times and in such Quantities as may be required by their Manager.

Tenders to be sent in by June 2 next, Forms for which can be obtained from

J. P. BEECHAM,
Secretary.

12, Silver Street, Cirencester,
May 9, 1910.

BOROUGH OF HEYWOOD.

THE Gas Committee invite Tenders for the Supply of 12,000 Tons of COAL and 500 Tons of CANNEL.

Specification and Form of Tender may be obtained upon Application to Mr. W. Whatmough, Gas Manager.

Sealed Tenders, endorsed "Coal," to be sent to me not later than Thursday, May 12, 1910.

By order,
GEO. G. BOUCHIER,
Town Clerk.

Municipal Buildings, Heywood,
April 20, 1910.

BOROUGH OF BARROW-IN-FURNESS.

THE Corporation are prepared to receive alternative TENDERS, on Forms to be obtained at the Office of the Gas and Water Manager, for the Supply of Screened GAS COAL and CANNEL for One, Two, or Three Years from the 1st of July next.

Tenders, addressed to the Chairman of the Gas and Water Committee, and endorsed "Tender for Coal," to be delivered at the Town Clerk's Office, not later than Twelve o'clock noon on Tuesday the 24th of May, 1910.

The lowest or any Tender not necessarily accepted.

By order,
L. HEWLETT,
Town Clerk.

Town Hall, Barrow-in-Furness.

THE Proprietor of the British Patents No. 8687, of 1908, for "LAMP BURNING WITH HYDROCARBON OR OTHER VAPOURS," and No. 10,736, of 1908, "IMPROVEMENTS IN PETROLEUM AND LIKE STOVES," desires to SELL his Patents or to grant LICENCES thereof.

All communications should be addressed, in the first instance, to L. DUVINAGE, Patent Agent, 10, Avenue des Nerviens, BRUSSELS.

THE Owner of Patents No. 90, of 1906, and No. 14,189, of 1906, relating to "Improvements in Tubes made of Spirally Wound and subsequently Soldered Metallic Strips and Process of Manufacturing the same," and "Improvements in Machines for the Manufacture of Tubes from Metal Strips," desires to Negotiate with Manufacturers with the view of Granting LICENCES under them upon Reasonable Terms. For Information, Apply to LLOYD WISE AND CO., Chartered Patent Agents, 46, LINCOLN'S INN FIELDS, W.C.

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BY

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MESSRS. A. & W. RICHARDS beg to notify that their SALES BY AUCTION of NEW CAPITAL ISSUED UNDER PARLIAMENTARY POWERS, and of STOCKS and SHARES belonging to EXECUTORS and other PRIVATE OWNERS in LONDON, SUBURBAN, and PROVINCIAL GAS and WATER COMPANIES, take place PERIODICALLY at the Mart, TOKENHOUSE YARD, E.C.

Terms for Issuing New Capital, and also for including other Gas and Water Stocks and Shares in these Periodical Sales, will be forwarded on Application to MESSRS. A. & W. RICHARDS, at 18, FINSBURY CIRCUS, E.C.

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By order of the Directors of the

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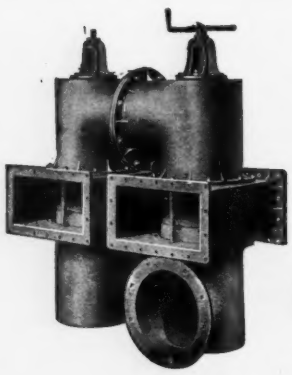

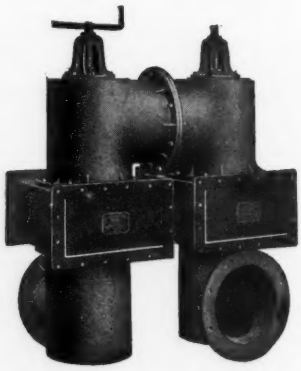

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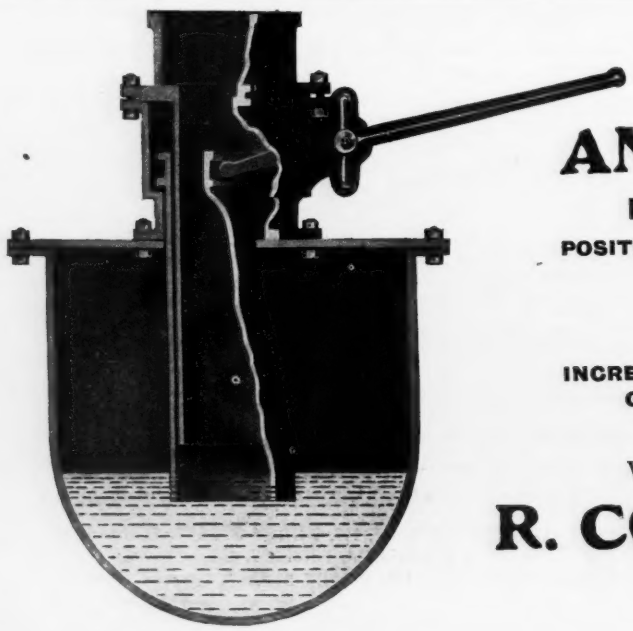

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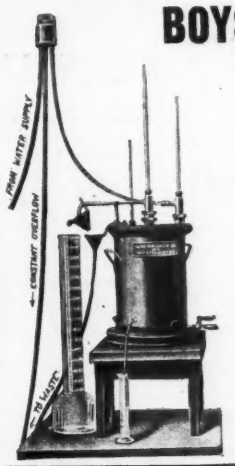

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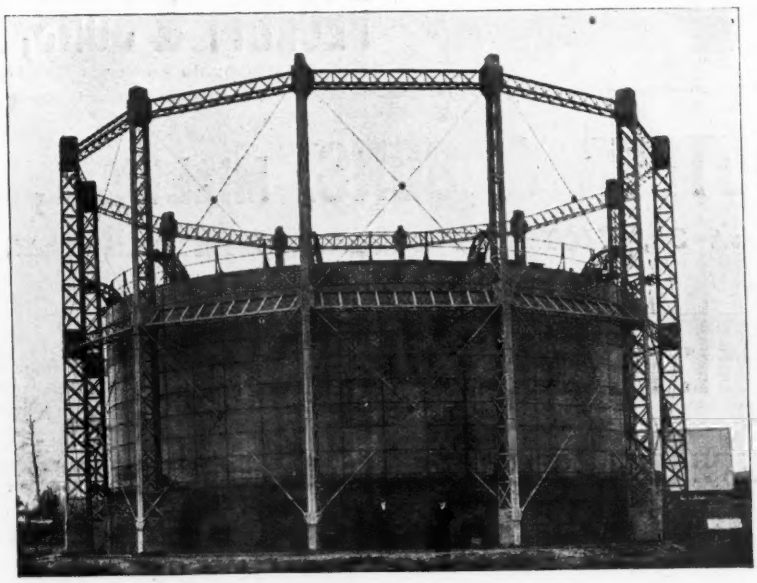

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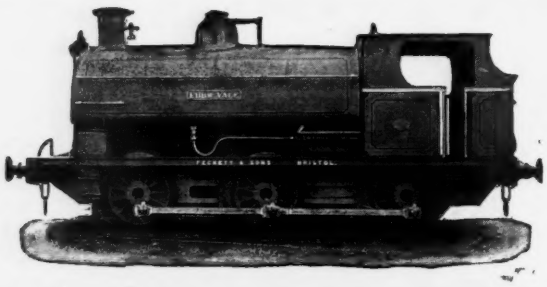

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MAXIMUM EFFICIENCY GUARANTEED.
Inspection of Working Plants Invited.

No. 227.

Welsbach
LIGHT
Inverted Arc Lamp, Fig. 623.

Storm Proof—
For Exterior Lighting.

Welsbach-Kern
(Patent) Inverted System

BRITISH MADE.

BRITISH MADE.

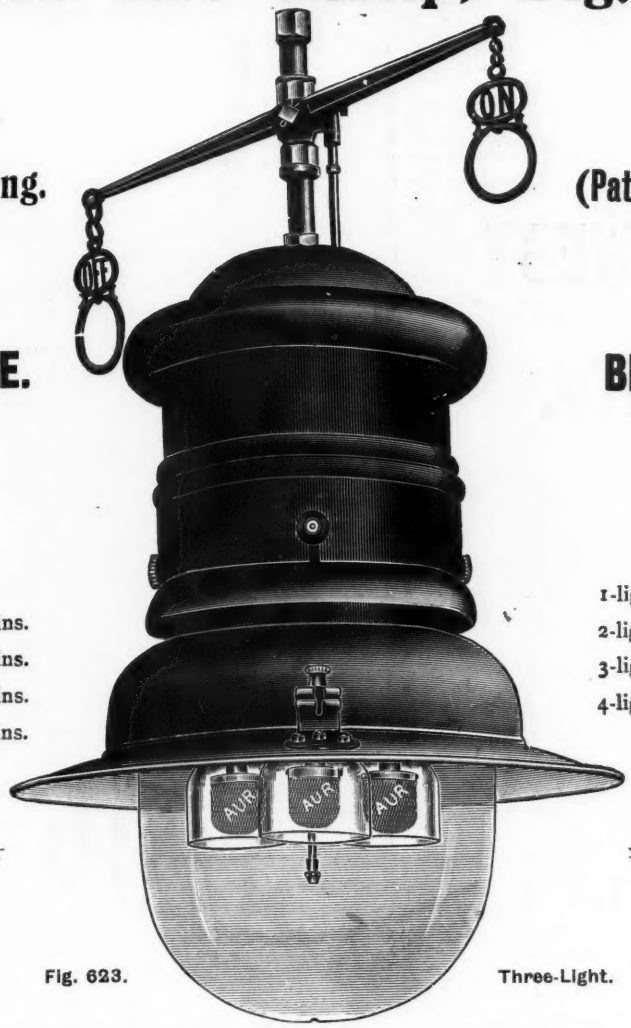

Fig. 623. Three-Light.

Height over all.

1-light . . .	1 ft. 8 ins.
2-light . . .	2 ft. 4 ins.
3-light . . .	2 ft. 4 ins.
4-light . . .	2 ft. 7 ins.

Width over all.

1-light . . .	1 ft. 1 in.
2-light . . .	1 ft. 5 ins.
3-light . . .	1 ft. 5 ins.
4-light . . .	1 ft. 8 ins.

ENAMELLED Green Steel Casing, fitted with Welsbach-Kern Inverted Burners, Gas and Air Regulators operated from outside. Sliding Door to give access to Burners for cleaning purposes. Fitted with Magnesia Nozzles, Welsbach Mantles, and Glass Mantle Protectors. Complete as shown. Highly efficient and regenerative.

	Gas per hour.	*C.P.*	*Steel.*	*Copper Case.*		*Gas per hour.*	*C.P.*	*Steel.*	*Copper Case.*
1-light	4 feet	125	**30/-**	**5/-** extra.	3-light	12 feet	400	**52/6**	**6/-** extra.
2-light	8 feet	260	**47/6**	**6/-** extra.	4-light	16 feet	550	**72/6**	**9/-** extra.

All on or off, or One light on and the rest off, **7/6** per Lamp extra. Cup and Ball, **3/6** per Lamp extra.

RENEWALS.

Glass Mantle Protectors (Fig. 623) **3/4½** per dozen, or in case lots of 5 gross, **33/-** per gross.

	1-Light.	*2-Light.*	*3-Light.*	*4-Light.*
Clear Glass Globes, each	**2/3**	**5/9**	**5/9**	**9/-**
" " " In Case lots per dozen.	**19/6**	**57/9**	**57/9**	**93/-**
Case contains . .	*80*	*18*	*18*	*12*

	1-Light.	*2-Light.*	*3-Light.*	*4-Light.*
Wired Globes, extra each	**2/-**	**2/-**	**2/9**	**3/6**
Parabolic Reflector, extra "	**3/6**	**6/-**	**7/6**	Not made

Welsbach Mantles, each **6d.** subject as usual.

The Welsbach Mantles for Upright lighting are "C," "CX," and "Plaissetty," price **4½d.** each.

THE WELSBACH INCANDESCENT GAS LIGHT CO., LTD.,
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REDUCED TO

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Lead Wool requires no melting and can be used in water without risk.

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THE NEW RETORT

Will withstand high temperatures and is **Guaranteed not to Contract or Soften** under Heat.

GREATER CONDUCTIVITY THAN ANY FIRE-CLAY RETORT.

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Telegrams: "MORTON, HALIFAX." ESTABLISHED 1783. *Tel. No. 134.* **HALIFAX.**

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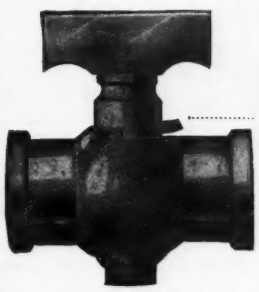

FIG. 1. The Old Style with the Old Trouble.
Note the Pin **A.**

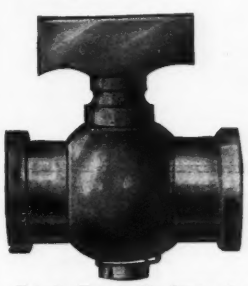

FIG. 2. **Evered's Patent "Safety Stop."** No Pin. No trouble.

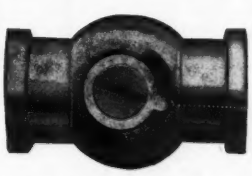

FIG. 3. Underside showing "Safety Stop" in lieu of Pin.

EVERED'S PATENT "SAFETY STOP."

Buyers of Gas Fittings are familiar with the trouble constantly arising through the Stop Pin of the Tap or Cock getting bent or broken, or falling out, thus leaving the Tap without a Stop, and leading to great danger of an escape of Gas.

EVERED'S PATENT "SAFETY STOP"

renders the old Stop Pin unnecessary and is an absolutely **Safe and Permanent Stop.**

The projection shown in Fig. 3, marked **B,** working in the recess shown in Block, allows the Tap to be turned only so far as the recess extends. There is no possibility of the Tap turning further round as there is no Pin to become displaced or broken.

Any fitting specifically so ordered will be made with the "Safety Stop."

EVERED & CO., LTD.,

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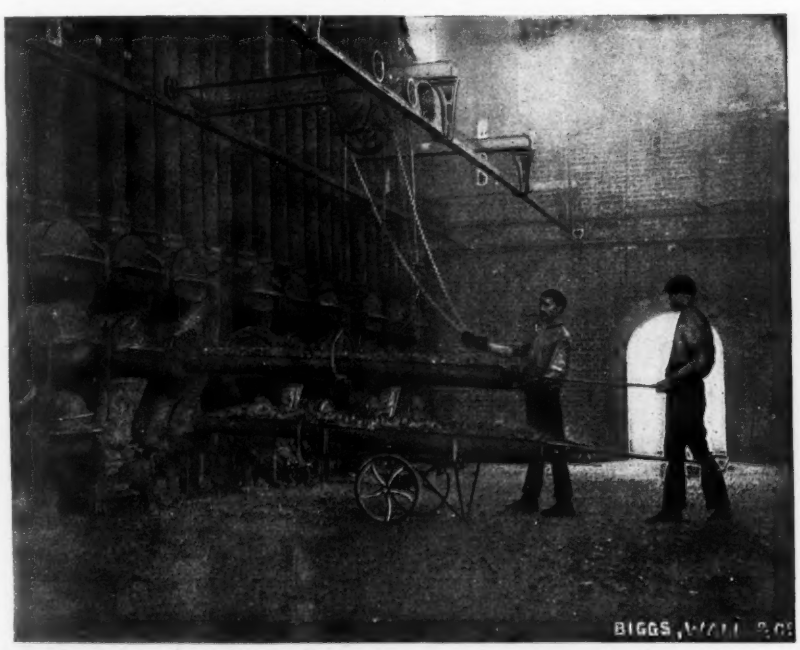

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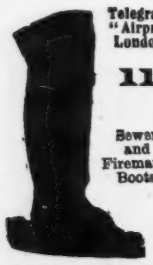

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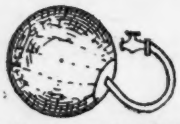

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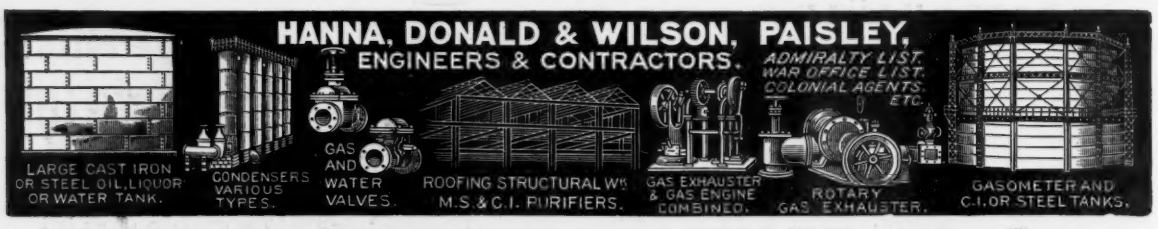
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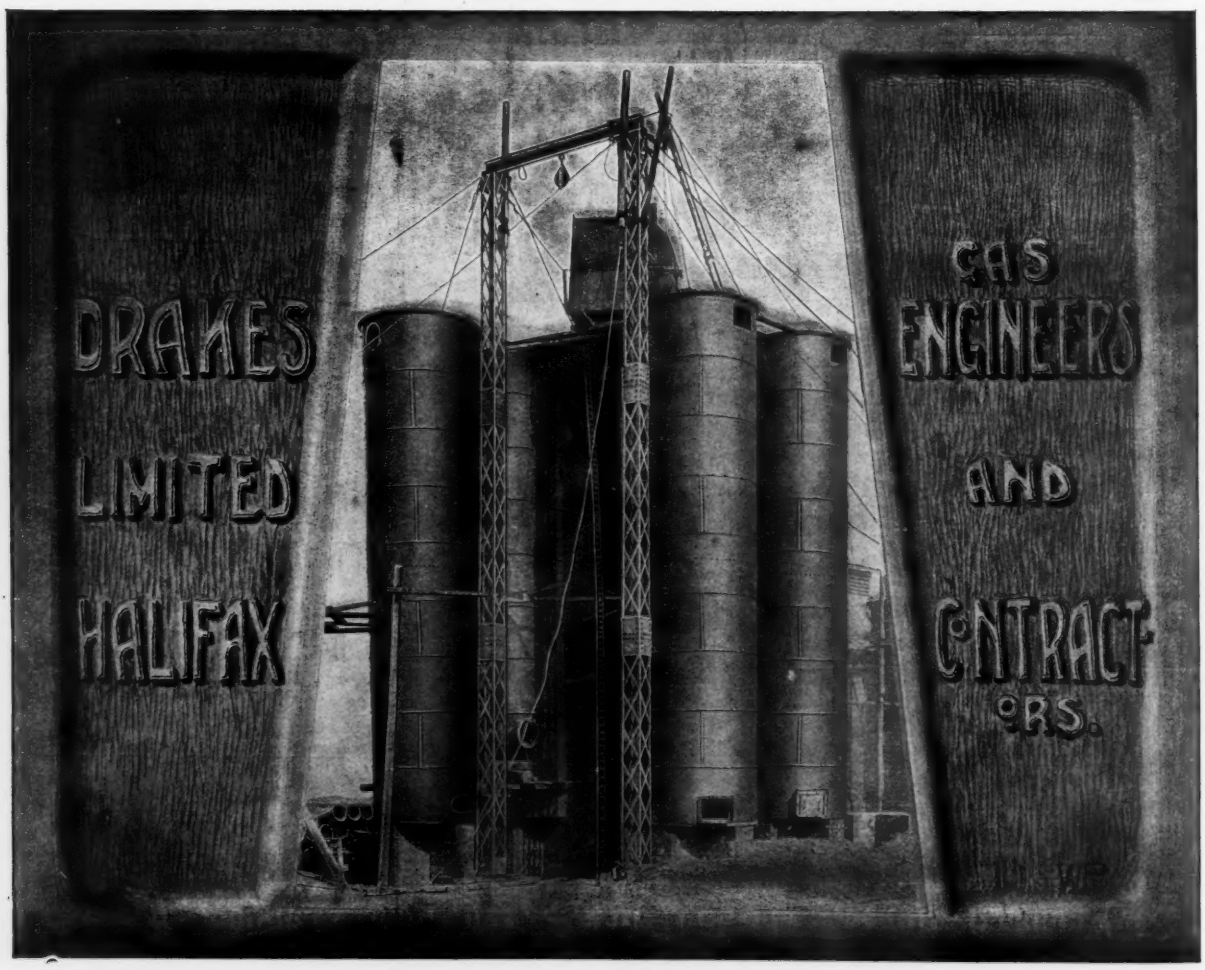

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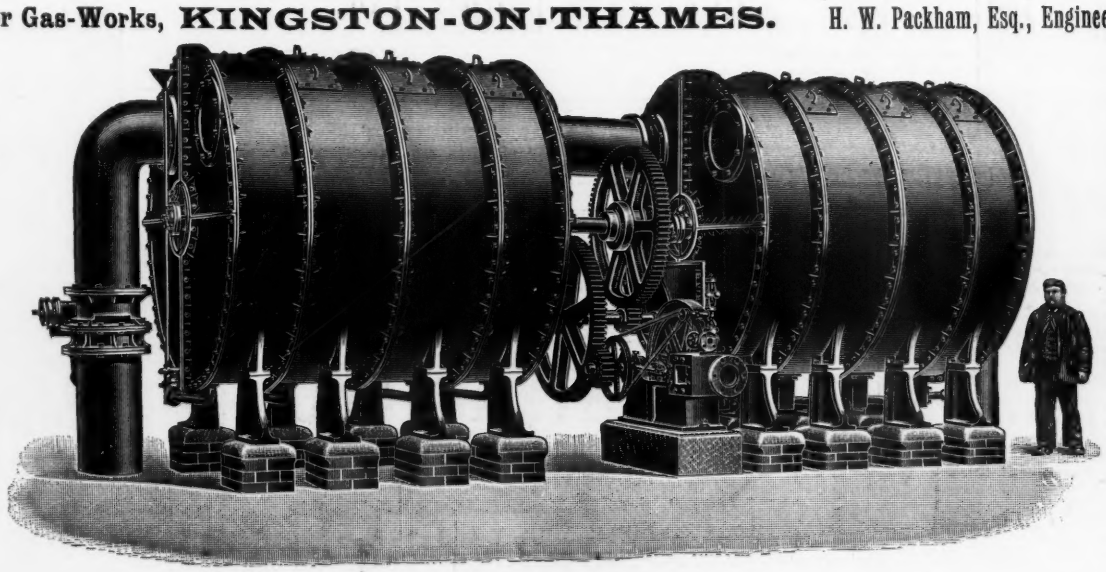

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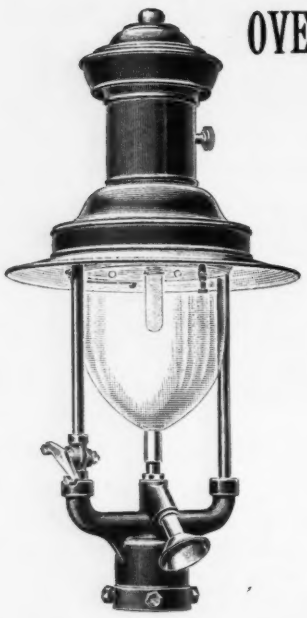

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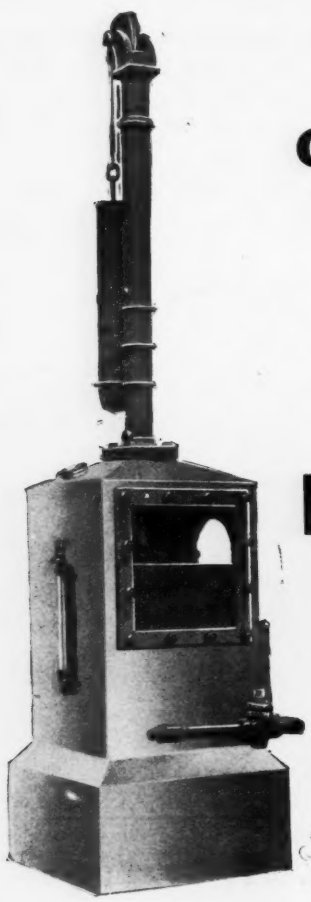

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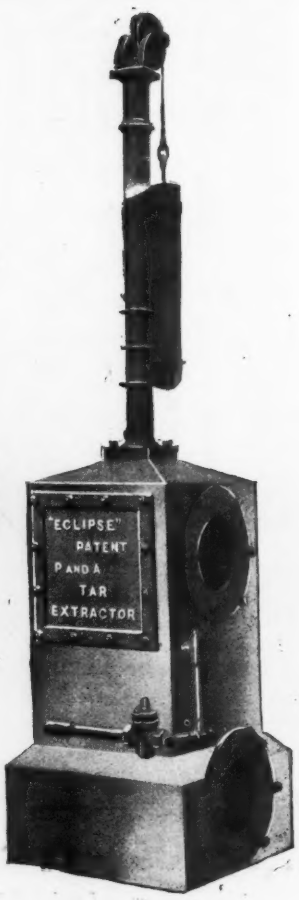

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